

# DISSERTATION

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*Privatization of Health Care  
Provision in a Transition  
Economy: Lessons from the  
Republic of Macedonia*

*Robert J. Nordyke*

**RAND Graduate School**

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## **PREFACE**

This dissertation has been accepted by the RAND Graduate School in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Policy Analysis.

In 1996 the Government of Macedonia began a comprehensive Health Sector Transition Project (HSTP) under a World Bank credit. The RAND Corporation was under contract to provide technical assistance to the Government of Macedonia on aspects of the health sector financial reforms for primary health care (PHC). The author was part of the RAND project team, living in the country from 1996 to 1998. The survey research conducted as part of the HSTP Technical Assistance project was supplemented with additional fieldwork and research to examine the behavior of physicians in the existing private sector in PHC and the prospects for further privatization.

To address these issues, this study employs a dual research approach. First, the policy environments governing primary care, both currently and as proposed by the reforms, are examined with respect to their ability to facilitate the introduction of market forces in health care. Secondly, data from a survey of public and private PHC physicians is analyzed in a novel production function framework to investigate how physician workload and resource utilization are influenced by the financial and regulatory incentives that they face. Together, these approaches yield a rich set of recommendations to improve the effectiveness and fairness of the introduction of market forces into health markets in a transition economy.

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## EXECUTIVE SUMMARY

The Republic of Macedonia is undertaking sweeping reforms of its health sector.<sup>1</sup> Funded by a World Bank credit, the Health Sector Transition Project (HSTP) is a comprehensive reform program that seeks to improve the efficiency and quality of Primary Health Care (PHC) by significantly strengthening the role of the market in health care provision. On the supply-side one of the key HSTP proposals is to implement a capitation payment system for PHC physicians. By placing all PHC physicians on productivity-based contracts, these reforms will effectively privatize all primary health care (PHC) provision. In addition, the Ministry of Health is considering the sale of public PHC clinics to private groups, indicating the government's commitment to marketization of health care provision.

Macedonia is in a unique position to develop a new role for the private sector in health care provision. The private provision of outpatient care was legalized soon after independence in 1991 to help meet demands of patient choice and physician self-determination. While private physicians account for less than 10% of all physicians, most provide primary care and 22% of PHC physicians in Macedonia are in private practice. If the reforms are fully realized, all PHC physicians – over 40% of all physicians – will be financially responsible for their clinical practices.

This dissertation draws on the experience with the partial privatization 1991-1997 and offers significant lessons for the ongoing reforms. I seek to inform the reform debates on two levels. At a sectoral level I evaluate the policy environment that governs the private sector, both currently and that proposed by the reform program. This component of the research addresses how the reform program can structure policies that adequately support and regulate a private health market in a transition economy. At the level of individual physicians, this dissertation examines the performance of physicians under the existing private/public system, specifically the effect of payment incentives on physicians' decisions in treating patients. By evaluating factors influencing physician productivity and resource utilization this will provide input to the design of PHC physician incentive and payment systems.

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<sup>1</sup> The current UN designation is The Former Yugoslav Republic of Macedonia; I use the Republic of Macedonia and Macedonia throughout this study.

## **BACKGROUND**

Similar to other post-socialist states, the roots of the efficiency and quality problems of the Macedonian health systems lie in the heritage of the Yugoslav health care system and broader economic structure (Istenich, 1995). The Yugoslav planning system shaped policies towards the health sector in general, and health care facilities that had pervasive effects on financing and delivery, down to the level of physicians' clinical practices. It is this heritage that reformers are struggling with today.

The health institutions of the former Yugoslav system are largely unchanged and are still financing or providing services in Macedonia. Health care financing is organized by the Health Insurance Fund (HIF), based on Macedonia's segments of the SFRY Social Insurance Fund. Service provision has likewise remained unchanged. The dominant form of provider organization is the municipality-based Medical Center which typically consist of a general hospital with stand-alone clinics providing specialist outpatient services. Medical Centers also administer Health Centers that provide in large urban multi-department clinics and smaller urban ambulatory clinics. Rural clinics also fall under Health Center management. All physicians in the public sector are paid salary, which for primary care physicians runs \$300 to \$500 per month, about 20 – 50% of private physician incomes.

## **POLICY ISSUES**

The Macedonian reforms are initially targeted at improving delivery of PHC and are aimed at both existing public and private primary care physicians. Given the status of primary care in Macedonia, especially in public clinics, capitation could have a large positive impact. In addition to making patient satisfaction relevant to public physicians, capitation may also improve quality by raising the pay and low prestige of PHC, thereby encouraging better doctors to choose PHC as a career. It may also have a large initial effect in efficiency if it allows providers to focus on true costs of practice, such as referrals to more costly specialist care. Finally, public primary care physicians receive the same salary, regardless of volume or quality. With the reforms, physicians in public clinics will be rewarded for higher productivity. This should tend to level pay and also enhance competition between the two sectors.

Due to the nature of transition economies, proper payment incentives and administrative controls are not sufficient for successful privatization. In introducing market forces to health care provision in transition economies, reform programs must build market institutions to serve as enabling frameworks for the financial incentives that encourage efficient decision-making at an individual level. For example, problems at the level of the national economy, such as the ailing banking system, seriously affect the ability of physicians to finance capital improvements under privatizing reforms. At a lower segment of the health sector, referral prohibitions established by municipal Medical Centers thwart attempts to increase competition between physicians.

The issues that this dissertation addresses exist at two levels. First are the policies governing private markets in the health sector; the development of effective market institutions to support the private sector. Second are the physician-level responses to incentives that are designed to control market failures and to encourage higher quality and efficiency.

### **Sector-level policies**

Systems that enforce financial discipline, effective legislative and regulatory mechanisms, and protection of private property are insufficiently developed in the health sectors of transition economies.

In Macedonia, policy toward private provision has, as in other countries, been implemented haphazardly and often with little consistency in different regions of the country. Private sector policies and others governing behavior within the public sector, are often not currently addressed by the reform program with negative consequences for competition, efficiency, entry and exit, and integration of the health system. For example, public doctors are shielded from competition by Medical Centers that deny private doctors hospital privileges. This policy may also inappropriately reduce hospital referrals by private doctors. And, in most municipalities, private doctors also cannot receive referrals from the public sector. These referral policies counter the advantages of productivity-based payment systems under the reforms. Furthermore, they continue to block integration of service provision across sectors, reducing efficiency and quality of care.

Entry and exit in the private market is largely controlled by the HIF, which is responsible for granting, administering, and revoking contracts with physicians to provide care reimbursed by

the Fund. Thus the size and growth of the private sector are largely at the discretion of the Director of the HIF. Furthermore, actions at lower levels of the HIF also complicate private decision-making such as retroactive changes in the list of reimbursable services made by HIF branch offices.

As a final illustration of policy barriers to reform, financing capital investments in both sectors face important and different constraints. Public clinics are characterized by poor structural quality, generally lacking adequate facilities and even basic equipment. This lack of investment stems from the historic lack of investment in PHC in the former system and is exacerbated by chronic budget deficits suffered since independence. In the private sector, physicians rely on self-financing since the banking system, like many poorer CEE countries, is in poor condition and places onerous terms on individual borrowers. This results in a selection effect such that many private physicians are relatively wealthy or able to raise funds from, typically, managers of large enterprises. Those that would rely on the banking system either establish poorly equipped clinics or are effectively precluded from private practice. Without addressing these related problems, efforts to expand private PHC will be seriously challenged.

### **Provider-level incentives**

Private doctors, who bear financial risk for their operations, have incentives to retain FFS reimbursements and treat patients in their offices. To increase income, they may increase fees, increase patient loads, improve patient-perceived quality, and de-emphasize preventive and public health services. Unregulated, such a system can lead to supplier induced demand. Conversely, the lack of quality- and efficiency-based incentives in the public sector may also lead to inappropriate referrals and unnecessary test-ordering. Additionally, the higher incomes in the private sector are motivation to leave public practice, and may lead better physicians to abandon public clinics. The PHC reform program seeks to solve these problems by reorienting incentives for efficient and high-quality of care in both sectors with a productivity-based payment system for all primary care doctors.

Regardless of payment approach implemented, capitation or FFS, each faces the same fundamental design issues. First, in either capitation or fee-for-service, physician income and ultimately the strength of the incentives depend in large part on the number of patients seen, or

physician utilization. The primary issue, then, is to design productivity-based performance incentives with an adequate patient load, while also balancing the need for reasonable physician income and the realities of the HIF budget. Second is the issue of eligibility for the new payment system. Due to geography or the nature of the practice, some physicians may not have adequate patient volume to generate a livable income, for example those in rural clinics or gynecology departments. Finally, a central theme of the payment reforms is to encourage the efficient use of resources. The degree to which individual physicians are financially responsible for their practices – lab costs, referrals, staff, even facility costs – will have important impacts on the ability of reforms to improve efficiency.

## **RESEARCH APPROACH**

A central argument of this study is that behavior of physicians is determined not only by the different payment structures in the two sectors but also by other market and regulatory incentives. Further, that in a transition economy such as Macedonia, reforms to physician payment systems will not achieve the goals of reform unless the broader market and regulatory issues are addressed.

To illuminate these embedded issues, I adopt a two-part research plan. First, at the sectoral level I address how the reform program can structure policies that adequately support and regulate a private health market in a transition economy. This is done by a qualitative analysis of the PHC policy environment – the rules, regulations and procedures that govern PHC provision. This analysis identifies policy failures and other barriers to effective functioning of the PHC system. It also provides essential context to interpret results of the second component of the analysis.

In this second part of the analysis, I use cross sectional data from a survey of physicians to understand how physicians respond to the existing incentive structures of the private market in terms of workload and resource use. I model physician production as a jointly determined process of workload and input utilization. Such a formulation acknowledges the endogeneity of input and output and, more important, allows the straightforward estimation of the demand equations for three key inputs: physician time, capital equipment, and consumable materials.

In the first step, physician output level is conditioned on individual, patient, department, and market characteristics. Concurrently, utilization of inputs is conditioned on predicted output

level and individual physician, patient and department characteristics. Incentives for physician effort are captured by a variable identifying public/private practice. Scale and scope effects are measured by the number of nurses per physician in the physician's department and the number of specialty departments in the physician's clinic. Control variables include the standard measures of physician characteristics, patient case-mix and market characteristics. A significant innovation in this work is the inclusion of a physician skill measure in the individual characteristics. Derived from scores on written case simulations, or vignettes, this skill variable provides information on the process quality of care.

Together, these two analytic approaches assist the development of policy options that ensure the privatization reforms of primary care succeed in improving the overall quality and cost-effectiveness of the Macedonian health care system.

## **SUMMARY OF FINDINGS AND RECOMMENDATIONS**

The analysis finds evidence of productivity benefits among existing private PHC physicians. In addition, these physicians also respond to the incentives of private practice by having available higher levels of medical equipment, an effect consistent with higher patient satisfaction. However, the overall findings of this study show that neither the existing policy environment nor that envisioned by the reform program allow market forces to significantly change physician practices in a post-socialist country. Indeed, physician responses to certain policies, such as arbitrary restrictions on productivity and referral prohibitions, suggest that these policies have a negative impact on efficiency and the quality of care. Moreover, the public sector delivery system is insulated from private sector competition by a web of policies and practices at all levels of the health sector. If left in place, this policy environment will dilute the ability of payment reforms to improve the efficiency and the quality of care.

These findings should be viewed as inputs to the process of developing effective, implementable reform policies. The following recommendations help provide a starting point for designing future policies toward health care privatization.

*Payment Incentives* The difficulties of designing physician payment schemes are well illustrated by the Macedonian experience. Results of the quantitative analysis are consistent with incentives for service overprovision and the relatively low referral rates of FFS payment in the private

sector. On the other hand, salaried public sector physicians have much higher referral rates than private sector colleagues, raising concerns over the cost of secondary care. Relative to private PHC physicians, public physicians also provide fewer services per patient as workloads rise. Neither condition is optimal. The main focus of the reforms – capitation – may not be optimal either as it tends to create incentives for underprovision of services and relatively higher referral rates.

Creating incentives for cost reduction by making physicians financially responsible for their practices is at the heart of the capitation-based reforms. This is a radical departure from the long-standing norms in public clinics; instituting unambiguous financial responsibility for all inputs to patient care will be essential to the improvements of efficiency and quality envisioned by the reforms. Briefly, financial responsibility would encompass nurses, office space, capital equipment, laboratory services, supplies and medications. Tracking input use in each of these categories at the level of individual physicians may be beyond the capacity of Health Center information system in the near future. In the short-run, department- or even clinic-level fundholding schemes may be a solution. Similarly, controlling the incentives under capitation for high referrals to secondary/in-patient care and laboratory services may stretch the capacity of Health Center information systems, especially if use of these resources is tracked at the individual physician-level. However, individual utilization reviews of referrals may be adequate in the near term.

An issue intimately related to the payment system is improving productivity. Measured as patient visits per week, physician utilization is uniformly low in Macedonia. Raising it could increase patient access and, potentially, quality of care for a greater part of the population. Physician workloads are arbitrarily limited in the existing private sector. Low motivation and lack of performance-based incentives hinder productivity in public clinics. Introducing performance-based incentives and permitting competition could also boost productivity and quality of care.

*Clinic Resources* The reforms seek to reorient the disparate financial incentives in the public and private sectors by allowing all physicians to retain the difference between their productivity-based payment and the costs of treating patients. However, under current reform proposals, financial responsibility for, and access to, clinic resources is not well defined for physicians in

public clinics. Furthermore, the existing system has created clear disparities in levels of capital and human resources in public and private clinics. Thus, in planning for the reforms, there are two key areas of concern over capital equipment and other clinic resources.

The first of these stems from the actions of the HIF to restrict the size and competitiveness of the private sector. Under the reforms with all PHC physicians under contract, the HIF may still have similar control and further, this behavior may shift to Health Center management as the group that controls resources required by physicians. An extension of the current situation in the private sector to the public sector could distort the incentives intended by the payment reforms. For example, if publicly-owned Health Centers remain the single dominant PHC clinics in each municipality, though they are undercapitalized, clinic management could potentially charge above market rates by restricting physician access to equipment and other resources. To ensure that the reforms create incentives for efficient and appropriate resource use, contracts should be written between physicians in public clinics and clinic management. Such contracts should specify payment by physicians for equipment utilization, laboratory use, and use of nursing staff and other non-physician personnel. These contracts define rights and responsibilities for physician access to the *inputs* of patient care, and should be seen in the same light as the contracts between physicians and the HIF for the *output* of patient care. The viability of these contracts would be improved if clinic ownership were defined explicitly. Options include contracting operation of public clinics, or their sale, to private groups.

Secondly, public clinics have much lower levels of capital equipment than private PHC clinics. This situation is due largely to an historic lack of funding which unfortunately promises to be a chronic condition for years to come. Improvements in capital investment in public clinics are a necessity. Increased grant aid is a possible source of funding as are mandated set-asides from physician revenues that are earmarked for capital improvements. These longer term solutions aside, mobilizing private resources may be the only option to quickly boost capital investment. However, ownership and management of public clinics are barriers to this. Contracting for the operations, or the sale, of public clinics may provide adequate incentives for private investment in capital equipment. There is a question whether the banking system in Macedonia could generate enough funding to bring Health Center capital equipment to adequate levels. One

option would be to follow the Czech privatization model which subsidized loans for capital investment based on the proceeds of the sales of formerly public medical facilities.

*Referral Policies* There are a number of restrictions on access to care in the current PHC system. Private physicians are denied hospital privileges and access to patient records. Also, public sector physicians are prohibited from referring to private physicians. The main concern here is that this may degrade the continuity of and limit efficiency gains possible if care in both sectors were more closely integrated.

To promote effective competition for services and improve the continuity of care, referral practices and hospital privileges should be liberalized. In place of blanket restrictions on referrals and privileges, other methods can be implemented to regulate referrals to secondary and in-patient care. These include withholds and other financial incentives for meeting referral goals, pre-admission screening, and mandatory second-opinions for hospitalizations. Additionally, to counter the referral incentives of either FFS or capitation, physician referral practices must be regulated for both over- and under-referrals.

*Education Policies* The Macedonian health system inherited a number of educational policies that are in transition. In addition to reducing the number of medical school enrollees already begun, this study highlights two other areas for increased attention in the reform program.

First, the importance of improving physician skill was demonstrated by evidence that more highly skilled physicians make a trade-off between numbers of visits and quality of care and also that better physicians are more restrained in the use of medications. Both point to the potential value of continuing medical education (CME) in promoting better care and costs-savings in primary care settings. CME will help boost the quality and status of PHC, as will implementation of a Family Practice specialty in medical school as planned by the reforms.

The findings of this study also reflect the nature of the current graduate medical education system. Medical graduates compete for the few positions in the public sector, partly due to the benefits of completely subsidized graduate specialty training. Once trained, many graduate specialists then depart the public sector for the more lucrative private sector. Under the reforms, distinctions between private and public practice will diminish and thus the incentives to leave publicly-owned and operated clinics. Nonetheless, revisiting the policy of fully subsidized post-

graduate education may be warranted once the reform policies for both PHC and secondary-care specialists are finalized.

*HIF and MoH Regulations* Contracts for professional services between individual physicians and the HIF are the basis of existing private sector PHC provision. Similar contracts for professional services will be central to the reforms. Unfortunately, current HIF procedures for issuing and managing physician contracts are fragile and unreliable. To ensure the function of the health system the HIF and MoH should consider three elements of administrative reforms. First, procedures for granting and administering contracts must be standardized, made transparent, and disseminated to physicians. Physician participation in the establishment and evolution of these procedures may increase acceptance of rule changes. Second, grievance procedures for HIF contract actions should also be implemented that are transparent and less costly than existing procedures. This could be along the lines of the former grievance board within the HIF, separate from the costly and still-transitioning legal system. Finally, improving the overall level of structural quality in the PHC system will be a long process. Developing comprehensive quality assurance programs throughout the health sector will be a part of this process. This dissertation examined only one small aspect of government's role in quality assurance, standards enforcement. Equitable enforcement of quality standards by both the MoH and HIF will help improve quality of care throughout the system by encouraging both private and public clinics to meet facility quality standards.

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I would like to thank all my friends and colleagues in Macedonia who helped during all stages of research – and life – while in Skopje. Foremost among many is Fimka Tozija whose knowledge and tolerance are unsurpassed. Members of my dissertation committee were essential in getting me to make clear discussions of a complex issue compounded by subtle data sources; remaining opacities and errors are my fault alone. Jim Dertouzos guided the modeling efforts and raised the standards for this field of policy analysis. John Peabody was instrumental throughout this process, from first providing the research opportunity to showing me how to “do” health policy research. My most profound thanks go to Al Williams for his exceptional mentorship in the face of events that would lay the rest of us low. And, of course, this dissertation would not have been possible (certainly not finished) without Ninez and the motivation that Alexandra and Malaya continually provide.

## 1. Research Purpose and Design

The Republic of Macedonia is undertaking sweeping reforms of its health sector.<sup>1</sup> Under a World Bank credit, the Macedonian government is implementing the Health Sector Transition Project (HSTP). The HSTP is a comprehensive reform program that seeks to improve the efficiency and quality of care by significantly strengthening the role of the market in health care provision. One of the key HSTP proposals, a new productivity-based payment system for primary care physicians, will effectively privatize all primary health care (PHC) provision. The design of the new payment system is still being debated and is scheduled for implementation early in the 2000s. In addition, the Ministry of Health is considering the sale of public PHC clinics to private groups, indicating the government's commitment to marketization of health care provision.

Macedonia is in a unique position to develop policies for a new private sector in health care provision. The private provision of outpatient care was legalized soon after independence in 1991. However, the restriction to outpatient care and administrative barriers to entry have restricted the private sector so that today private physicians account for less than 10% of all physicians. If the reforms are fully realized, all PHC physicians – over 40% of all physicians – will be financially responsible for their clinical practices.

This dissertation draws on the experience with the partial privatization 1991-1997 and offers significant lessons for the ongoing reforms. I seek to inform the reform debates on two levels. At a sectoral level I evaluate the policy environment that governs the private sector, both currently and that proposed by the reform program. This component of the research addresses how the reform program can structure policies that adequately support and regulate a private health market in a transition economy. At the level of individual physicians, this dissertation examines the performance of physicians under the existing private/public system, specifically the effect of payment incentives on physicians' decisions in treating patients. By evaluating factors influencing physician productivity and resource utilization this will provide input to the design of physician incentive and payment systems.

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<sup>1</sup> The current UN designation is The Former Yugoslav Republic of Macedonia; I use the Republic of Macedonia and Macedonia throughout this study.

This prospectus continues with an overview of health sector reforms in Central and Eastern Europe (CEE) and highlights key features of the Macedonian health care system. It concludes by summarizing relevant policy issues and the research plan for this dissertation.

## **BACKGROUND**

The term privatization is subject to ambiguity and interpretation, especially in post-socialist contexts. So, before proceeding, a definitional task: When used in developed market economies, privatization typically denotes the transfer of public assets to private ownership. In CEE by contrast, the term has been used variously to describe limited introductions of market forces in particular industries to the total transformation of formerly planned economies. In public service provision, it has been used to denote contracting of limited services or introducing competition between government agencies (Mills, 1998; Saltman and Figueras, 1997; Vickers and Yarrow, 1991). In reference to industrial restructuring, privatization has been used to identify administrative methods of transferring state assets to private hands (Pohl et al., 1997; Brada, 1996; Bohm and Simoneti, 1993).

These techniques are means toward the ultimate objective of privatization in CEE – to establish a market economy. Most observers agree that the sale of state assets to private parties is not sufficient to develop a market economy (Gray, 1996). Moreover, focusing all political efforts on the relative simple task of transferring ownership rights from the state to private hands detracts from the hard task of developing market institutions (Murrel, 1992). Following several authors I adopt a broad process definition of privatization, meaning the development of private markets with the explicit goal of restructuring a planned economy into a market economy; including, but not limited to, the transfer of property rights (eg., Clague et al., 1997; Murrel, 1996; Gray, 1996).<sup>2</sup> With respect to the existing public health sector in Macedonia this includes: developing policies that effectively regulate private markets; shifting decision-making and financial responsibility to service providers; and, establishing incentives for efficient resource utilization and higher quality of care.

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<sup>2</sup> Privatization in CEE is treated as a general, contextual case in this study. Health care privatization is the specific case in which there are a number of intrinsic features that preclude the formation of a pure “market economy” in health care provision in any nation.

## CEE Health Reforms

A centerpiece of health sector reforms across Central and Eastern Europe (CEE) is the promotion of private sector health care delivery (World Bank, 1993). These reforms are set in the context of broader economic and political reforms throughout many post-socialist transition economies. Privatization seeks to raise the efficiency and quality of health care systems by liberalizing demand, diversifying supply, and improving demand- and supply-side incentives (Preker and Feachem, 1995; Saltman and Figueras, 1997).

Despite this promise, there are many critics of private care in developing and transitioning countries (Saltman and Figueras, 1997; Bennet et al., 1994; Cichon, 1991; Roemer, 1984). Economies in transition face similar demands for government intervention as any country due to the same limitations of private health care provision: barriers to entry, asymmetric information, limited provision of public goods, and other problems stemming from the profit motive such as induced demand.

CEE health systems have inherited a host of other problems from the communist period. These include populations suffering poor health status, doctors who are over-specialized and under-employed, clinics that are undercapitalized and inefficient, and opaque financing systems that are open to corruption (Borissov and Rathwell, 1996; Preker and Feachem, 1995; Mills and Lee, 1993; McKee, 1991). Drops in real income and public funding for health accompanying the economic transition have stagnated or worsened these problems. For example, prior to 1991 many CEE countries had national insurance systems which for many years ran large deficits. Decreases in available funds during transition have pushed these insurance programs further into deficit. Capital spending has also declined or stopped altogether and conditions in public hospitals and health clinics have deteriorated due to a lack of investment funds during transition. Furthermore, affordable and cost-effective primary care has been further weakened by the common CEE emphasis on specialty care. Where private provision does exist, it has been fueled less by policies designed to decrease public spending than by nascent demand created by dissatisfaction with poor quality services of publicly provided clinical care (Orosz, 1995; Griffin, 1989).

## Macedonian Health Sector

Macedonia declared independence from an already disintegrating Yugoslavia in 1991, and by 1992 was established under a new constitution supported by international recognition as a sovereign state. It was one of the poorest regions in the former Socialist Federal Republic of Yugoslavia (SFRY), and among republics and regions of SFRY during the 1980s ranked second to last behind only Kosovo in GNP/capita, infant mortality, and life expectancy (Mastilica, 1990). Independence itself caused a steep decline in output and the economy had only recently begun to grow pending the impact of the 1999 conflict in Kosovo. Macedonia's GDP per capita was \$990 in 1996. Macedonia's population was 2.1 million according to the 1994 census; 72% Slavic Macedonians, 22% ethnic Albanians with the remaining 6% comprising Turks, Romas, and Serbs. A map of The Republic of Macedonia is shown in Figure 1.1.

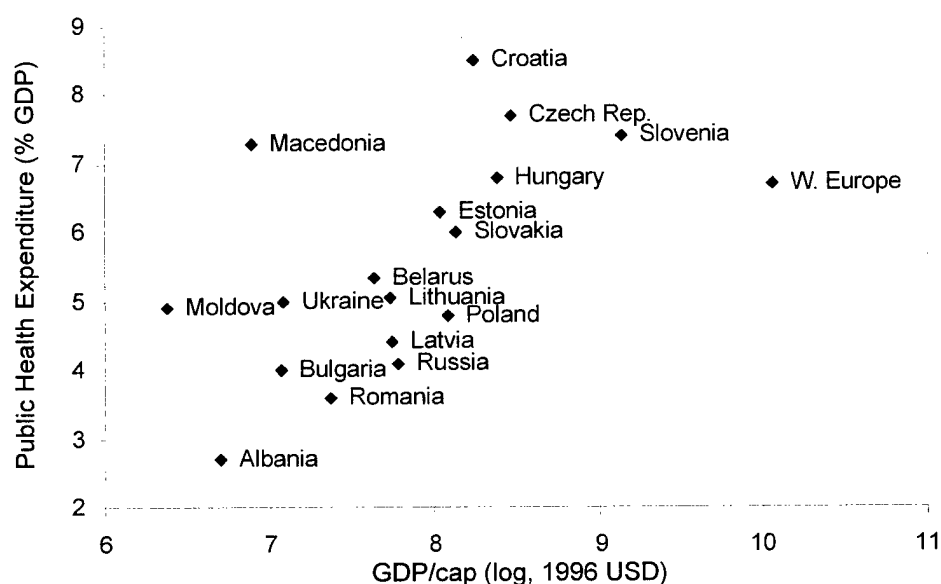
**Figure 1.1 – Map of The Republic of Macedonia**



The health status of the Macedonian population is typical of the epidemiological transition found in CEE (Adeyi et al., 1997). Infant mortality has nearly halved since 1986 with a mean of 22.5 per 1000 live births in 1994. This, however, is second only to Albania in all of Europe and there is significant inequality within Macedonia as infant mortality in 1994

varied on the municipal level from 4 to 32 per 1000 live births (Peabody, Ponce and Molyneaux, 1997). Life expectancy, at 72 years is comparable to higher income countries in Europe. As might be expected, the leading causes of death, cardiovascular disease and cancer, are also like those of richer countries. Moreover, what gains Macedonia has achieved in population health status have been expensive. As shown in Figure 1.2, Macedonian public spending on health in terms of GDP is high relative to both western and eastern European countries.

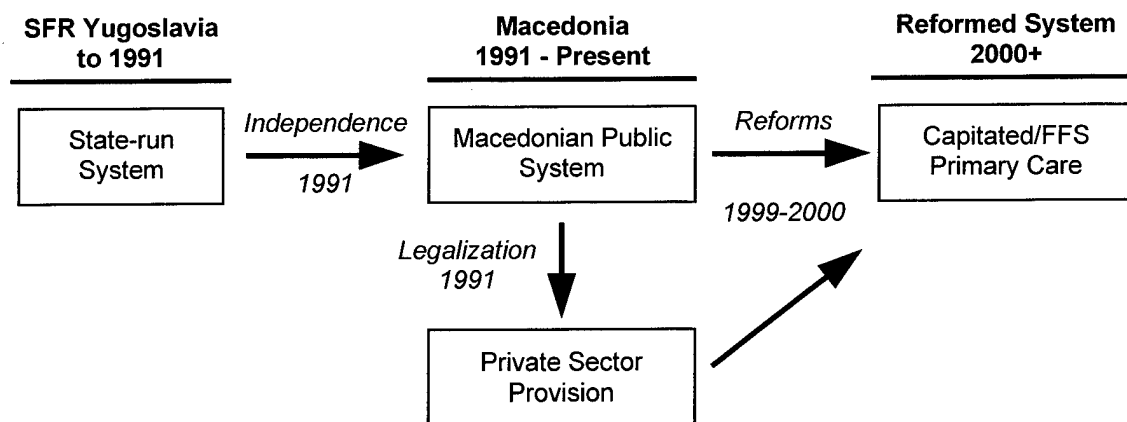
**Figure 1.2 – Public Expenditure on Health vs. GDP/capita**



Source: Health expenditures (1990-1995) - World Bank (1998), W. Europe means weighted by GDP/capita.  
GDP/capita - World Bank (1998), W. Europe means weighted by population.

Similar to other post-socialist states, the roots of the efficiency and quality problems of the Macedonian health systems lie in the heritage of the Yugoslav health care system and broader economic structure (Istenich, 1995). The Yugoslav planning system shaped policies towards the health sector in general, and health care facilities that had pervasive effects on financing and delivery, down to the level of physicians' clinical practices. It is this heritage that reformers are struggling with today. The development of the health system over time is depicted in Figure 1.3.

**Figure 1.3 – Development of outpatient, primary care in Macedonia**



The health institutions of the former Yugoslav system are largely unchanged and are still financing or providing services in Macedonia. Health care financing is organized by the Health Insurance Fund (HIF), based on Macedonia's segments of the SFRY Social Insurance Fund. Service provision has likewise remained unchanged. Nearly all tertiary care is provided in the teaching hospital in the capital, Skopje. The dominant form of provider organization is the municipality-based Medical Center, based on the old socially-owned enterprise model. While there are some differences across municipalities, Medical Centers typically consist of a general hospital with stand-alone clinics providing specialist outpatient services. Also under Medical Center administration are Health Centers or Polyclinics that provide preventive and primary care and limited secondary care in a multi-departmental setting. Some Medical Centers also administer urban ambulatory clinics with only one or two departments. Rural clinics fall under Health Center management. All public sector physicians are paid salary, which for primary care physicians runs \$300 to \$500 per month.<sup>3</sup>

Private provision of outpatient health care was legalized in 1991 to help meet demands of patient choice and physician self-determination. The private sector is examined in detail in following chapters, other highlights are provided here as useful background. Under law, physicians entering private practice may not also practice in the larger public sector. While the private sector accounts for less than 10% of all physicians, over 85% of private

<sup>3</sup> The average wage in Macedonia is about \$300 per month.

physicians practice General Medicine, Pediatrics or Gynecology.<sup>4</sup> Private physicians account for 22% of all PHC physicians nationally and up to 30% in some regions. Compared to their public sector colleagues in PHC, private practitioners are more highly trained and work in better-equipped facilities overall, raising quality of care concerns.<sup>5</sup> Private physicians who have contracts with the HIF to provide allowed services are paid on a fee-for-service basis. While no reliable income information is available, estimates of private physician income run from 2 to 5 times that of public physicians.

HSTP reforms aim to unify PHC under a single payment system. The World Bank program calls for capitation payment, while the Macedonian Parliament and Physicians Chamber have pressed for fee-for-service payment.<sup>6</sup> The HSTP is developing both demand-side and supply-side strategies to improve the quality and efficiency of primary HC provision across Macedonia. Demand-side strategies under consideration include a new basic benefits package, changed coinsurance rates and coverage policies, management of care and patient cost sharing. These strategies aim to increase utilization of PHC and decrease total expenditures. Demand side incentives are reviewed in detail in Farley and Peabody (1997). Our main focus is on the supply-side – the policies and payment incentive system designed to influence physician behavior.

The Macedonian reforms are initially targeted at improving delivery of PHC and are aimed at both existing public and private primary care physicians. Given the status of primary care in Macedonia, especially in public clinics, capitation could have a large positive impact. In addition to making patient satisfaction relevant to public physicians, capitation may also improve quality by raising the pay and low prestige of PHC, thereby encouraging better doctors to choose PHC as a career. It may also have a large initial effect in efficiency if it allows providers to focus on true costs of practice, such as referrals to more costly specialist care. Finally, public primary care physicians receive the same salary, regardless of volume or quality. With the reforms, physicians in public clinics will be rewarded for higher productivity. This will level pay and also enhance competition between the two sectors.

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<sup>4</sup> Primary Health Care is not well established in Macedonia, as elsewhere in the region (Tatar and Tatar, 1997). The reforms aim to consolidate primary care in the practice of general medicine, pediatrics, and gynecology.

<sup>5</sup> These data are from the source of data for this data, a Facility Survey of physicians conducted in 1997.

## POLICY ISSUES

All countries struggle to arrive at an appropriate mix of public and private health care provision, arguing the merits of market versus government roles. Within these debates, market proponents predominantly emphasize supply-side incentives schemes designed to increase services and ensure an efficient use of resources and better quality of care. The World Bank-sponsored reform program in Macedonia contains these conventional supply-side elements; payment incentives for efficiency and quality.<sup>7</sup> These are coupled with administrative controls for recognized market failures such as over-referrals and excessive care.

Due to the nature of transition economies, proper payment incentives and administrative controls are not sufficient for successful privatization. That is, like other still-planned sectors of transition economies, markets simply do not exist for there to be market failures in any strict sense. In introducing market forces to health care provision in transition economies, reform programs must build market institutions to serve as enabling frameworks for the financial incentives that encourage efficient decision-making at an individual level. For example, problems at the level of the national economy, such as the ailing banking system in Macedonia, seriously affect the ability of physicians to finance capital improvements under privatizing reforms. At a lower level in the health sector, referral prohibitions established by municipal Medical Centers thwart attempts to increase competition between physicians.

The issues that this dissertation addresses exist at two levels. First are the policies governing private markets in the health sector. Specifically, this dissertation examines the development of market institutions broadly and whether government policies toward the private sector are effective. Second are the physician-level responses to incentives that are designed to control market failures and to encourage higher quality and efficiency. These issues are outlined in the remainder of this section.

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<sup>6</sup> Capitation pays physicians a fixed rate per enrollee per time period. Fee-for-service reimburses providers a fixed amount for each of a specified list of clinical services.

<sup>7</sup> Reforms of demand-side incentives, medical education, and other elements of the The World Bank program are summarized in Chapter 3.

## Sector-level policies

Systems that enforce financial discipline, effective legislative and regulatory mechanisms, and protection of private property are insufficiently developed in the health sectors of transition economies. Due to the lack of effective legal and political institutions that characterizes transition economies, policies toward the private sector are a haphazard mix of rules and regulations that inadequately control the private sector and fail to integrate it with the public sector to help meet national health goals (Rosenthal and Newbrander, 1997; Gilson and Mills, 1995; Bennet et al., 1994). Commonly, policies are established on an *ad hoc* basis in reaction to needs of a growing private sector with no coherent plan for regulating private provision (Roth, 1987). This scenario can lead to legal and administrative policies that distort the function of private health markets in many developing countries (World Bank, 1993). As shown in this study, these barriers in the policy environment of post-socialist, transition economies are pervasive and may prove detrimental to well-designed, if narrow, supply-side policies aimed at stimulating PHC services. While it is hoped that privatization will overcome these barriers, due to the nature of CEE health sectors and privatization in transition economies, the narrow introduction of market forces into publicly-provided PHC may not be sufficient to build this capacity much less functioning private markets in health.

In Macedonia, policy toward private provision has likewise been implemented haphazardly and often with little consistency in different regions of the country. Private sector policies and others governing behavior within the public sector, are often not currently addressed by the reform program with negative consequences for competition, efficiency, entry and exit, and integration of the health system. For example, public doctors are shielded from competition by Medical Centers that deny private doctors hospital privileges. This policy may also inappropriately reduce hospital referrals by private doctors. And, in most municipalities, private doctors also cannot receive referrals from the public sector. These referral policies counter the advantages of productivity-based payment systems under the reforms. Furthermore, they continue to block integration of service provision across sectors reducing efficiency and quality of care.

Entry and exit in the private market is largely controlled by the HIF which is responsible for granting, administering, and revoking contracts with physicians to provide care reimbursed

by the Fund. This has several important consequences. Sole discretion over granting and revoking contracts to licensed private physicians is held by the Director of the HIF. Due to restrictions on new contracts, the annual number of new entrants to private practice dropped by over 90% (from 27 to 2) between 1995 to 1997. Also, while contract revocations are rare, several did occur during 1995-1997. Concurrently, in 1996 the HIF Director also abolished the Fund's grievance board, a forum for resolving contract disputes with private physicians. Finally, actions at lower levels of the HIF also complicate private decision-making such as retroactive changes in the list of reimbursable services made by HIF branch offices.

As a final illustration of policy barriers to reform, financing capital investments in both sectors face important and different constraints. Public clinics are characterized by poor structural quality, generally lacking adequate facilities and even basic equipment. This lack of investment stems from the historic lack of investment in PHC in the former system and is exacerbated by chronic budget deficits suffered since independence. In the private sector, clinics must meet minimum well-enforced standards for facilities, sanitation, and equipment and similar demands for capital investment. However, the banking system, like many poorer CEE countries, is in poor condition, lacks public trust, and places onerous terms on individual borrowers.<sup>8</sup> As a result, many private physicians are relatively wealthy or able to raise funds from, typically, managers of large enterprises. Those that would rely on the banking system either establish poorly equipped clinics or are effectively precluded from private practice. Without addressing these related problems, efforts to expand private PHC will be seriously challenged.

### **Provider-level incentives**

Financial incentives facing physicians in private practice, though well known, face additional problems in developing countries (e.g., Healy and McKee, 1997; Bennet et al., 1994).

Private doctors, who bear financial risk for their operations, have incentives to retain patient fees and treat patients in their offices. To increase income, they may increase fees, increase patient load, raise patient-perceived quality, and de-emphasize preventive and public health services. In Macedonia, most private doctors provide primary care services reimbursed by the Health Insurance Fund on a fee-for-service basis. Unregulated, such a system can lead to

supplier induced demand. Conversely, the lack of quality- and efficiency-based incentives in the public sector may also lead to inappropriate referrals and unnecessary test-ordering. Other problems arising from the large difference in income between the two sectors have important implications. The higher incomes in the private sector are motivation to leave public practice, and may lead better physicians to abandon public clinics. Additionally, low pay and low morale may exacerbate the normal, substandard practice of PHC in the public sector. In marked difference to the motives in private care, publicly provided PHC is largely limited to prescribing medications and referring patients to secondary care.

The PHC reform program seeks to solve these problems by reorienting incentives for efficient and high-quality of care in both sectors. The core of this approach is a productivity-based payment system for all primary care doctors. Specifics of the system have not been finalized and there is some debate about the precise approach. The World Bank advocates for capitation, while the Macedonian Parliament is also considering a fee-for-service system in the public sector. A combination approach may also be possible. A demonstration program that tests one or both schemes will be implemented in selected districts in 2000. This demonstration seeks to establish whether the new payment and other changes<sup>9</sup> lead to a more rational use of resources, raising overall efficiency and quality.

Regardless of payment approach implemented, each faces the same fundamental design issues. First, in either capitation or fee-for-service, physician income and ultimately the strength of the incentives depend in large part on the number of patients seen, or physician utilization. The primary issue, then, is to design productivity-based performance incentives with an adequate patient load, while also balancing the need for reasonable physician income and the realities of the HIF budget. Secondly, related to utilization is the issue of eligibility for the new payment system. Due to geography or the nature of the practice, some physicians may not have adequate patient volume to generate a livable income, for example those in rural clinics or gynecology departments. Finally, a central theme of the payment reforms is to encourage the efficient use of resources. This is especially important in the current public clinics where physicians do not bear any financial costs of their resource

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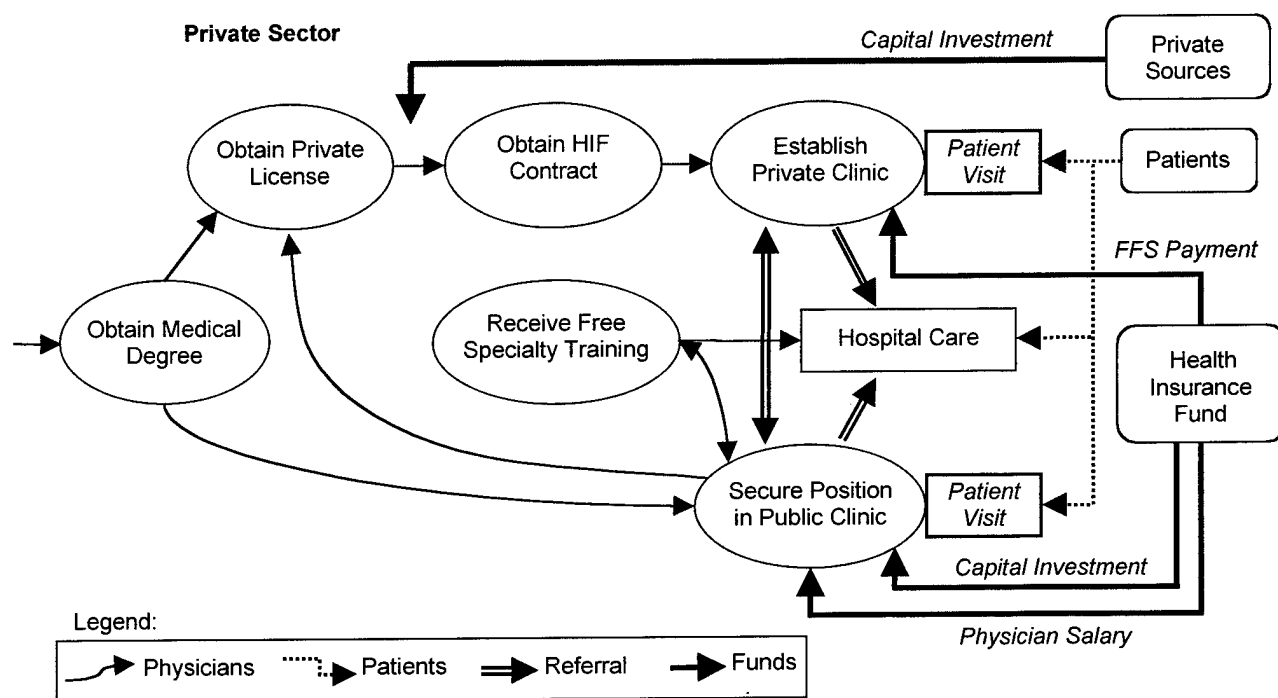
<sup>8</sup> e.g., 100% collateral, 20% interest rate and 6 month maturity.

decisions. The degree to which individual physicians are financially responsible for their practices – lab costs, referrals, staff, even facility costs – will have important impacts on the ability of reforms to improve efficiency.

## RESEARCH PLAN

A central argument of this study is that behavior of physicians is determined not only by the different payment structure in the two sectors but also by other market and regulatory incentives.<sup>10</sup> Further, that in a transition economy such as Macedonia, reforms to physician payment systems will not achieve the goals of reform unless the broader market and regulatory issues are addressed. As an illustration of this, Figure 1.4 depicts a model of the existing Macedonian primary health care “system.”

**Figure 1.4 – System Model of Primary Health Care**



<sup>9</sup> Including a new list of covered services, continuing medical education for PHC, new co-payments schedule, and new management information systems.

<sup>10</sup> Hausman and Le Grand (1999) add norms and standards of medical practice to this list. The reform program has begun addressing this area by implementing Continuing Medical Education (CME) for PHC.

Figure 1.4 represents all basic elements of the current PHC system including: the process of physicians entering either public or private practice; flows of public funds and private financing through the system; flows of patients; and, the patient/physician visit itself. In these terms, the aim of the reform program is to improve the efficiency and quality of the Patient Visit by redesigning the payment incentives for individual physicians. The primary vehicle for this – physician payment systems – is shown as salary or FFS payment from the HIF to health care providers. The remaining sector-level policies left unaddressed by reforms, such as graduate education eligibility and referral policies, are also represented in the Figure.

Figure 1.4 likewise highlights the research questions answered by this dissertation. At the sectoral level I address how the reform program can structure policies that adequately support and regulate a private health market in a transition economy. This is done by a qualitative analysis of the PHC policy environment illustrated in Figure 1.4; essentially all system elements outside the Patient Visit. An underlying assumption of this study is that neither the existing policy environment, nor that planned by the reforms, is an adequate foundation for the privatization of health care provision. This analysis identifies policy failures and other barriers to effective functioning of the PHC system.

In the second component of the analysis, I use cross sectional data from a survey of physicians to answer the question: How do physicians respond to the existing incentive structures of the private market? Referring again to Figure 1.4, this component of the analysis tests the effect that differing payments have on physician decisions made during the *Patient Visit*. These decisions are considered in terms of workload and resource use. Theory is ambiguous on the effects of payment incentives (see Chapters 4 and 6). Motivation to maximize incomes suggests that private physicians will have higher patient loads and more efficient resource use than salaried public physicians. Conversely, private physicians seeking to please and retain patients may spend more time and use more resources on fewer patients. The matter is complicated further by the fact that the Macedonian private sector is heavily regulated with significant constraints on physician choices on workload and services provided. With these considerations, it would be somewhat arbitrary to state *a priori* hypotheses concerning physician responses to existing incentive systems. To understand the

factors influencing such decisions, I develop a model of production decisions made by physicians in the two sectors.

Together, these two analytic approaches will help develop policy options that ensure the privatization reforms of primary care succeed in improving the overall quality and cost-effectiveness of the Macedonian health care system.

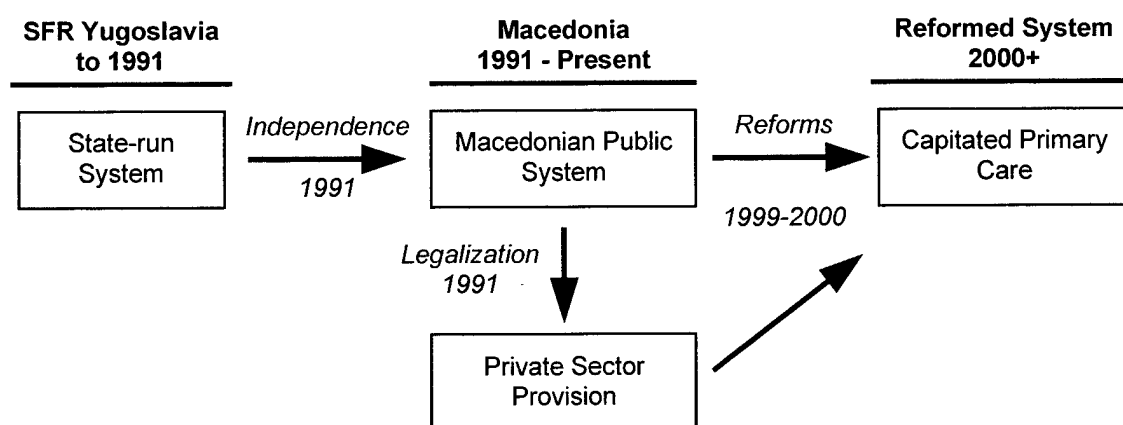
## **ORGANIZATION OF THIS DISSERTATION**

This dissertation contains seven chapters. Chapter 2 provides background on the relevant economic history of Macedonia, highlights the development of its health sector, and also introduces the development of privately provided health care. The literature review in Chapter 3 develops an analytic framework for the qualitative portion of this study. It facilitates an evaluation of the policies governing the private sector with respect to the goals of developing well-functioning markets. This taxonomy structures the discussion of policy and market failures identified by the system model approach. Chapter 4 is an analysis of the policies governing the private health care sector currently, and those proposed under the reform program. It examines the policies governing the private sector, and PHC in general, and employs the privatization taxonomy established in Chapter 3 to determine whether the policy environment of the health sector, both currently and under the reforms, meet the goals of well-functioning markets. Chapter 5, is a review of the literature on private sector health care provision in developing and transition economies. Here I focus on the issues of efficiency and quality of care and summarize the literature on physician productivity that underlies the development of the model of physician output decisions. Chapter 6, Methods and Data, describes the quantitative analyses and survey data used in evaluating physician performance. Chapter 7 presents results of the analyses. Chapter 8 discusses conclusions and recommendations.

## 2. Survey of the Macedonian Health Care System

The roots of the efficiency and quality problems of health systems in the Yugoslav successor states lie in the heritage of the former Socialist Federal Republic of Yugoslavia (SFRY) health care system and broader economic structure (Istenich, 1995). This chapter describes the four major elements of development of the Macedonian primary health care system, the schematic of which is repeated here as Figure 2.1.

**Figure 2.1 – Development of outpatient, primary care in Macedonia**



This chapter opens with a brief introduction to the SFRY economic and health systems inherited by Macedonia. This is followed by a discussion of the existing public and private sectors and the role of each in PHC. A summary of the HSTP reform program closes this chapter. This chapter provides background for the remaining chapters which focus on private provision of primary health care.

### HERITAGE OF THE STATE HEALTH SECTOR OF MACEDONIA

#### Economic Structure

Despite popular perceptions of former Yugoslavia's relative market openness, there was a large degree of state control. The Yugoslav economic system was built on the ambiguous concept of social ownership, which in reality was state ownership without the normal institutions of state property (Lavigne, 1995). Under this version of market socialism, production was politically controlled at the local level with broad federal influence.

Republics, largely dominated by a single ethnicity, were given a large amount of autonomy within the Federation. Firms operated under self-management in which workers, through "management councils," ostensibly managed daily operations and monitored hiring and wages. Investment and production decisions were under political control and subject to federal approval (Lavigne, 1995; Uvalic, 1992). Limited decentralization of decision-making did not lead to free and competitive markets; local politicians were very protective of firms and shielded them from competition (Kraft, 1993).

The private sector was limited in the SFRY, consisting primarily of small commercial shops, and was "barely tolerated" by the state (Kraft, 1993). There were also strong feelings among the public that private profit was immoral; this bias against the private sector continues in many Yugoslav successor states (Bicanic, 1993; Kraft, 1993). Nonetheless, when output declined and inflation rose sharply again in the 1980's, the government attempted market-oriented reforms that included privatization of SOEs. Privatization was strongly advocated by the rich republics while the poor republics opposed it, feeling that they would be at an even greater disadvantage in competition with their richer neighbors (Ramet, 1992). Ultimately, the 1989 Law on Circulation and Disposal of Social Capital established some of the procedural steps required for large-scale privatization (Shukarov, 1993). Like the rest of the reforms, however, these procedures were very passive and had little real effect (Bicanic, 1993). Social sectors were unaffected by the 1980's cycle of reforms which were, regardless, superseded by war and national independence drives.

Privatization started slowly in Macedonia. Initial drafts of the privatization law were based on the 1989 Yugoslav law, but its passage was held up in Parliament for two years. While the formal sale of state-assets stalled, spontaneous privatization of enterprises was widespread and new firm startups developed quite freely. The Law on the Transformation of Enterprises with Social Capital passed in April 1993 and made provision for case-by-case asset sales, though in practice the dominant method for larger firms has been management buyout (Hadzi Vasileva-Markoska, 1995; Nova Makedonija, 1998a). Over 1,400 firms were privatized by the time the law expired in December 1998. Without a re-enactment of this, or similar, legislation, further sales of public assets must be considered on a case-by-case basis.

## **State Health Sector**

Social services were not a state priority in the SFRY since, like in other planned economies the productive sector was dominant and the “non-productive” social sector was seen as a consumer of income not as a producer of value (Orosz, 1995). The consequences were clear: low investment, low morale, and no national efforts to improve health sector performance. As part of a major economic restructuring in 1974, social service providers were reorganized into Self-Managed Communities of Interest (SMCIs). These organizations, based on the “socially owned enterprise” model were established at the municipality (similar to counties in the U.S.) level. They were intended to allow producers and consumers of social services to meet and exchange without state intervention (Svetlik, 1992). In reality, SMCI administration was highly bureaucratic, merely duplicating the state-level bureaucracy they were designed to replace (Istenich, 1995; Kraft, 1993; Parmelee, 1985).

As a result there was a high degree of fragmentation in services across regions (Istenich, 1995; McKee, 1991). Overlying this regional variation, health service provision was split into 3 tiers. Highly specialized quaternary care (e.g., organ transplants) was provided in federally organized clinics. Most specialty care, inpatient and outpatient, was provided in Clinical Centers of the Medical Schools in Republic capitals. Primary care was provided in SMCI-run urban Health Centers and Polyclinics and also in rural clinics. Finance for the Yugoslav system was managed by the federal Social Insurance Fund (SIF) which collected revenues and made provider payments based on inputs, such as number of beds or clinic visits, rather than health status or outcomes. The same institutional structures are still providing health care today in Macedonia.

## **CURRENT STRUCTURE OF THE HEALTH SECTOR**

### **Finance**

The Health Insurance Fund (HIF), organized in 1991 under the Ministry of Health, assumed the SIF's overall management of health care financing. Lower levels of the financing infrastructure have remained in place. Branch offices of the HIF, for example, are renamed IPO branch offices and still process and approve invoices from providers in their region, distribute coverage certificates to insured persons, and keep registries of insured persons.

Health care is a constitutionally-guaranteed universal right for citizens. Insurance contributions to the HIF to pay for these services are compulsory. HIF coverage provides a package of basic health benefits. In principle, these benefits may be supplemented with private insurance, but this practice is still limited. The health insurance system is funded primarily by a payroll tax of 8.6%. Workforce contributions total about 65% of HIF revenues, government fund transfers make up most of the rest (Peabody et al., 1996). Running annual deficits from through 1992 to 1998 of \$16.4 M to \$27.8 M, the HIF was in a debt to providers of over \$100 M after 1998 (World Bank, 1995; Paterson et al., 1997). The HIF has been in arrears since independence largely due to the 40% drop in real wages and high unemployment; actual payroll contributions were 83% of expected in 1993 (Paterson et al., 1997). As a result of unemployment and evasion of contribution, the insurance rate falls short of universality; a nationwide household survey conducted in October 1996 showed that nearly 38% of the population was not covered by insurance (Farley et al., 1997).

The insufficiency of public funding for health care services are further complicated by the payment system for providers. By law, both public and private provider *organizations* are paid by the HIF on an invoice-based fee-for-service (FFS) plan. Due to historical budgeting practices and the chronic deficit condition, the HIF does not strictly follow this. Actual determinants of the allocation decision are probably based on prior-year payments and there are large variations by municipality. For example, in 1995, the HIF paid only 75% of total invoiced amounts submitted by all public clinics, but the reimbursement rate from the HIF ranges from 46% to over 90% across municipalities (Paterson et al., 1997).

Capital investments for public providers are budgeted from a separate account within the HIF. These have been cut to near zero for the past few years. This compounds effects of the "legacy of low investment" in health care which communist systems have disproportionately neglected primary care (Healy and McKee, 1997). Capital investment was 1.6% of total expenditures for all public health organizations (Health Insurance Fund, 1996) and following historical practice much of this was probably concentrated in secondary and tertiary care.<sup>1</sup>

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<sup>1</sup> As a comparison, total direct capital expenditures as a percent of total expenditures for hospitals is about 8% for France (9.6%, 1988), Germany (6.9%, 1990), and the United States (8.0%, 1993). Source: Wiley et al. (1998).

### **Public clinics and providers**

Likewise, the division of service provision between facilities has largely remained unchanged since independence. Nearly all tertiary care is provided in teaching hospitals in the capital, Skopje. The dominant form of provider organization is the municipality-centered Medical Center, based on the former SMCIs. While there are some differences, Medical Centers typically consist of a general hospital often with stand-alone clinics providing specialist outpatient services. Medical Centers administer Health Centers or Polyclinics that provide preventive and primary care and limited secondary care; they comprise several departments. Some municipalities also have urban ambulatory clinics with only one or two departments. Rural clinics fall under Health Center management.

Compared to their West European counterparts, CEE physicians' pay and political power are quite low. This has consequences for reforms, which are discussed below. One reason for their current low status is that physicians emerged from the communist era without a coherent professional organization and thus had little significant political influence (Field, 1991). Doctors were viewed as components of the non-productive sector, serving the health needs of the productive workforce (Healy and McKee, 1997). The status of PHC physicians is further weakened by the fact that the medical profession is still dominated, numerically and politically, by hospital-based specialists. Under communism, primary care physicians were held in lowest regard and those attitudes still prevail (Orosz, 1995; Heitlinger, 1991; McKee, 1991). Even today, the concept of family practice is looked down upon, and PHC is considered "second class medicine" (Goldzweig, 1998; Tatar and Tatar, 1997). Nurses too suffer considerably less prestige than their Western counterparts; they perform no clinical duties and serve only as low-level administrators in the public sector. Physicians' status was also diluted by significant overproduction of physicians still the primary cause of high unemployment among physicians. Estimates of unemployment among physicians now in Macedonia range from 15% to 30%. Finally, without a history of strong professional organizations, the power of the medical profession lies in the Ministry of Health (Barr, 1996). This is typified in Macedonia where there are strong ties between the Medical Faculty and the Ministry and the influence of the Ministry also reaches into the municipalities as the directors of the Medical Centers are political appointees. Medical Centers are controlled by

management boards approved by Parliament and ownership of the Medical Centers and clinics is national (Ilievski, 1998).

There are three important implications of the physicians limited political power and low pay. First, primary care physicians, those most affected by the reforms, have little ability to positively influence the reforms. Medical lobby groups are growing, but they are still limited in power (Healy and McKee, 1997). In Macedonia, the Association of General Practitioners, for example has little influence over policies while a large majority of the group does not approve of the current reform strategy (Nova Makedonija, 1998b).

Secondly, quality and access to care may suffer in public clinics. Physicians in public clinics, paid on salary, work under essentially the same labor practices as in the SFRY. With little incentive for improving performance, the standard of care in PHC is referred to as "prescribe and refer," with consequent poor primary care and an overuse of more expensive secondary care. Further, poorly paid physicians have obvious incentives to seek additional income. Currently, with PHC physician wages at about \$300 per month gratitude payments are still common, as they are throughout CEE (Healy and McKee, 1997; Saltman and Figueras, 1997; Istenich, 1995). Better care or shorter waiting periods, for example, often depends on side-payments or family and political connections (e.g., Ledeneva, 1998). Although under-the-table payments and corruption are very difficult to quantify, reports from other countries indicate that such payments are significant (Healy and McKee, 1997; Borrisov and Rathwell, 1996). These practices appear to be difficult to eliminate as many doctors have vested interests in the existing system.

Finally, low status and low pay also have important implications for private sector development. Salaried physicians practicing in public clinics may be attracted to the higher potential income of the private sector. Furthermore, the large pool of unemployed physicians is a supply of potential entrants into private practice. A government pay freeze on the public sector in 1993 only accentuates these effects.

### **Private health care provision**

Privatization of health care provision in Macedonia has thus far been a gradual process. The 1991 Health Care Law legalized private outpatient practice, while still maintaining the

dominance of the subsidized public sector. Private inpatient facilities were not addressed by this legislation. Subsequent applications for private hospitals have been denied by the Ministry of Health.

Any physician legally licensed to practice in Macedonia may obtain a license to practice privately from the MoH. The Macedonian population is not rich enough to support a private sector on out-of-pocket payments for discretionary care, and an MoH license generally is not sufficient to maintain a private practice. Over 90% of private primary care physicians hold contracts with the HIF that are virtually identical to that for public health organizations. Under this fee-for-service plan private doctors provide basic out-patient care from a list of allowed services and receive reimbursement based on invoices. Private clinics are also required to meet the same structural and sanitary standards as public clinics, which are enforced via MoH and HIF inspections.

Payment incentives are markedly different in the private sector. Compared to the low fixed salaries in public sector practices, the FFS system payment to private practitioners offers the potential of much higher incomes to those entering private practice.<sup>2</sup> This, coupled with patient demand driven by the poor service in public clinics has fueled private practice growth. In 1994, three years following legalization, there were 217 physicians licensed to private practice, about 5% of all doctors. Growth since slowed and by late 1997 the Ministry of Health listed 380 licensed private physicians, about 8% of all doctors in Macedonia. As a comparison, nearly 50% of all physicians were private in the Czech Republic just two years after a very aggressive privatization program (Massaro et al., 1994). Slovenia, also richer than Macedonia but sharing its institutional heritage, had 3.3% of all doctors in private practice in 1994 (Istenich, 1995). Nearly all Macedonian private doctors are in solo practices or small partnerships, with the exception of the capital where there are a handful of larger group practices. Echoing other studies that find that private physicians locate in urban areas (Blumenthal, 1994; Bennet et al, 1994) only 10% of all physicians licensed to practice privately are located in rural areas (MoH, 1996).

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<sup>2</sup> Since most private clinics are proprietorships, FFS payments to private organizations are essentially payments to individual private physicians.

## The Primary Health Care System

Primary health care is undergoing changes in Macedonia. Indeed, a major aim of the HSTP is to strengthen the role and status of PHC. Currently, several specialties deliver what the Ministry refers to as primary care. Two of these, Labor and School Medicine, however do not provide what is commonly known as PHC but rather preventive and occupational health services. These specialties will be phased out or significantly reduced under the reforms. The intent of the HSTP is to ultimately designate as PHC those physicians that are candidate for participation in the privatizing reforms: General Practitioners, Gynecologists, and Pediatricians. Table 2.1 depicts the composition by specialty of primary care physicians. The second column lists all public physicians currently designated by the MoH as primary care. The third column lists all private physicians registered with the Ministry. The table identifies those physicians that are considered to provide PHC throughout this study.

**Table 2.1 – Licensed Private physicians and Public primary care physicians, by specialty.**

Specialty	Percent of all Physicians	
	Public	Private
<i>PHC</i>		
General Practice	55.6	68.2
Gynecologist	5.1	9.2
Pediatrics†	16.4	7.4
<i>Non-PHC</i>		
School Medicine	10.6	NA
Labor Medicine	12.3	NA
Other Specialty	0	15.2
Total number physicians	1918	380

Sources: MoH Registry of Private Physicians, 1997; MoH, 1996.

† - Pediatrics in Public clinics serves only pre-school age (0-6 years) School Medicine is a preventive specialty.

Both public and private physicians play important roles in PHC. Most PHC is provided by public physicians. However, due to the nature of the HIF contract and the restriction to out-patient practice, most private physicians provide PHC and account for about 20% of all PHC physicians. As the table shows, there are relatively more GPs in private practice and fewer pediatricians than in public clinics. The smaller proportion of pediatricians in private

practice may be due to restrictions against private physicians providing preventive care. Note also that the practice of pediatrics is subdivided into two sub-disciplines; one for children 0-6 years and one for children 7-18 years. The predominantly preventive specialties of school and labor medicine are practiced only in public clinics.

## **HEALTH SECTOR TRANSITION PROJECT (HSTP) REFORMS**

The HSTP is developing both demand-side and supply-side strategies to improve the quality and efficiency of primary HC provision across Macedonia. Demand-side strategies under consideration include a new basic benefits package, changed coinsurance rates and coverage policies, management of care and patient cost sharing. These strategies aim to increase utilization of PHC and other outpatient care and decrease total expenditures. Demand side incentives are reviewed in detail in Farley and Peabody (1997). Our focus here is on the supply-side; the capitation payment system designed to influence physician behavior (Carter et al., 1997).

Under the proposed capitation payment, physicians will be paid a fixed amount per time period for each patient enrolled in their practice. The defining characteristic of capitation is the transfer of financial risk from the insurer to the provider. Providers are responsible for the overall care of patients, make treatment decisions with generally fewer constraints than other payment systems, and are able to retain savings resulting from capitation payments exceeding costs. Advantages to insurers include reduced monitoring costs necessitated by other payment systems and more predictable expenditures (Latham, 1996). Capitation is also attractive to providers for two main reasons. First, they are able to regain some professional autonomy in being freer to decide on appropriate care for patients. Secondly, potential profits may be significant if costs are kept lower than total revenue from capitation payments from all patients. If structured correctly, these incentives are intended to improve the efficiency and quality of care. However, a common problem, which usually requires regulation, is the incentive to underprovide care that reduces overall efficiency and quality.

The reforms initially target improving delivery of PHC and include both existing public and private primary care physicians. Given the status of primary care in Macedonia, especially in public clinics, capitation could have a large positive impact. In addition to making patient

satisfaction important, capitation may also improve quality by raising the pay and prestige of PHC encouraging better doctors to choose PHC as a career. It may also have a large initial effect in efficiency if it allows providers to focus on true costs of practice, such as referrals to more costly specialist care. Finally, fairness in physician pay may improve. Public primary care physicians receive the same salary, regardless of volume or quality. With the reforms, physicians in public clinics will be rewarded for higher productivity. This will also level pay and enhance competition between the two sectors.

A demonstration capitation system will be implemented in 2000 to evaluate how the proposed reforms work in Macedonian primary care clinics. The design of the capitation system piloted in the demonstration program is preliminary. Supply side reforms consist of:

- PHC providers receive payment on a capitated basis for each patient they enroll in their practice, adjusted for case mix.
- Financial incentives to control excessive specialist referrals
- Enhanced financial responsibility for resource use among public physicians
- Tighter regulation of secondary and tertiary care while continuing salary-based pay for specialists.
- Physician selection whereby insurance subscribers choose a PHC physician and may switch providers periodically. Limits will be placed on the number of patients that PHC providers can have enrolled.
- A possible floor on public pay with a salary component set at some fraction of current salary.

Results from the pilot will be essential to finalize the specific incentive structures including: amount of capitated payments; physician eligibility; patient selection of physician; physician financial responsibilities for services and facility costs; and, regulation for the underprovision of services and overenrollment of patients. How these issues are resolved has substantial implications for the risks and rewards of practice under capitation. These will help determine the functioning of the primary health care markets including: improving efficiency and quality of care; introduction of fairness and competition; and, integrating the existing public and private sectors. In addition, there are other policy considerations that should be taken into account as the reform package is finalized and implemented nationally.

### 3. Private Sector Policies – The Literature

This dissertation examines the privatization of health care delivery in a transition economy. It is based on the notion that the behavior and performance of physicians in Macedonia are influenced both by financial and regulatory incentives. Financial incentives are defined by provider payment incentives including the FFS and salaried systems now in place, and the capitation system proposed by the reforms. Financial incentives are also influenced by the structure of health care provision common to other low- and middle-income (LMI) countries including low pay and inadequate facilities in the public sector. Regulatory incentives are defined by the policy environment of the private health care sector – the policies and procedures established in an *ad hoc* manner at all levels of the Macedonian health sector. This dissertation argues that the proposed reforms of provider payment incentives are a necessary, but not sufficient, condition for successful privatization of PHC. Reform of Macedonian PHC takes place in the broader context of a transition country struggling to transform institutions of a planned economy into institutions that support a market-oriented economy. As a consequence, broader market and regulatory incentives must also be considered in designing health care reform policies.

To illuminate these embedded issues, I draw on two main bodies of the literature. In this chapter, the growing literature on privatization and policy reforms in CEE transition economies establishes a framework for understanding the existing policy environment and identifies key issues for evaluating health care privatization programs. It is worth emphasizing that social sectors, and the health sector in particular, comprise a small fraction of this literature which primarily concentrates on privatization of manufacturing enterprises. I draw on CEE experience in both industrial and social sector privatization to build a taxonomy of economic and political objectives for developing private markets in transition economies. In Chapter 5, the extensive literature on public/private health care provision in LMI and transition countries provides an understanding of the economic incentives facing private physicians. This review informs the development of the model of physician performance, presented in Chapter 6.

## THE TRANSITION ECONOMY CONTEXT

Under communism, the economy was planned and controlled by a single political party. Whether localized or highly centralized, the state owned and operated enterprises under soft-budget constraints to support political goals and meet the objectives of industrial development, full employment. Kornai (1980) succinctly described this as the “shortage economy”: economic planning would set unattainable output goals for firms that became resource constrained; firms then tried to expand and hoarded the inputs that were available to them including labor, resulting in the “paradox” of concurrent general shortage and local surplus. Complicating matters, property rights were confused and diffusely held. No stakeholder in the state-owned enterprises – politicians, managers, nor workers – had sufficient incentive to improve operations (Uvalic, 1992). Inefficient state-owned enterprises (SOEs) were supported by a web of explicit and implicit subsidies. These subsidies included direct subsidies, inter-firm arrears, bad loans and credits, and artificially high prices for output all of which were partly financed by artificially low prices on agriculture and other inputs (Sachs, 1996). Under this array of perverse incentives, the systemic results followed: declining growth; low and falling productivity in all sectors; growing technology gap with the West; and low and declining standards of living and consumption (Lavigne, 1995).

Initial reform policies in CEE consisted of three major themes: stabilization, liberalization, and privatization (Ellman, 1997; World Bank, 1996a; Fischer and Gelb, 1991). Macroeconomic stabilization and trade liberalization policies have been implemented successfully in most of CEE. These actions were politically easy to enact and could be done almost “overnight” by decree, following the ‘big bang’ reform model most famously championed in Poland and Russia (Aslund, 1991; Sachs, 1991).

Other reforms, including privatization, are proving to be more difficult to implement. The World Bank reports that many reforms could take decades to complete (Ellman, 1997; World Bank, 1996a). This is more in line with the gradualist school of reforms in which political constraints are endogenous to the reform process and gaining political consensus is explicit in reform programs (Dewatripont and Roland, 1992; Roland, 1997; Vittas, 1997). The highly political nature of transition has thus forged a “new consensus” among orthodox policy advisers on the nature of the transition process itself. This view recognizes that the

constraints of institutional capacity and political power of powerful interest groups, in addition to economic goals, are central to the success of reforms (Ellman, 1997; Roland, 1997). Indeed, events in Russia during 1998 raise the question whether political resistance can be overcome by the logic of market reform. As transition economies are defined by the lack of institutions underlying a market economy, rebuilding and developing those institutions is the decades long task of the transition process. (Rapaczynski 1996; Murrell 1996; World Bank, 1996a; Fischer and Gelb, 1991; OECD 1991)

“Institutions” have received much scholarly attention the past decade and can have multiple meanings. Williamson first associated the term with firms, markets, and the contracts between them that deal with transaction costs (Williamson, 1985). North (1991) examined institutional change and its effect on economic performance. March and Olsen (1989) reinvigorated institutional analysis, defining institutions fundamentally as the embodiment of formal and informal rules in governmental administrative institutions. The transition literature tends to combine these notions, referring broadly to the institutional incapacity of CEE nations and the need for institution building including: legal and regulatory systems (e.g., Borish and Noel, 1996), courts, legal practices, and legal and managerial professionals (e.g., Murrell, 1996); and private markets, supporting financial systems, and incentives to improve efficiency (e.g., OECD, 1991).

Recent empirical work supports the importance of institutional heritage. Administrative institutions, the bureaucratic conventions and cultural norms inherited from years of communist rule have an important effect on the policy process and help determine the success of economic transition (de Melo et al., 1996). Cultural history, public attitudes toward the private sector, decision-making behavior in state agencies, and deeply-embedded corruption are neglected at the peril of reforms and obviate a blue-print approach to transition. Adequate analysis of these issues is, however, beyond the scope of this dissertation. This body of work is a point of departure for this investigation of health care privatization in a transition economy.

What characteristics of privatization in transition economies must health care reforms consider? What are the key objectives in privatization and what constraints might be faced?

This literature review identifies key features of successful privatization programs in CEE.<sup>1</sup> It focuses on the role of the state in establishing legal and regulatory structures supporting a market economy, the governance of firms, and the political sustainability of reforms.

## **PRIVATIZATION IN CEE**

The merits of private markets are often argued on philosophical grounds (Hayek, 1944; Friedman, 1962). However, the strongest policy arguments made in favor of privatization are put in economic terms (World Bank, 1996a; Johnson, 1995). Neo-classical economic reasoning for privatization is clear; placing the rights to an asset in private ownership achieves the highest possible efficiency as the owner seeks the best use of resources to meet the demands of the market. Early in transition, this argument dominated and rapid privatization was widely viewed as the only option for solving the efficiency and governance crises in the state owned enterprises (SOEs); the task of establishing and enforcing financial control of the SOEs was considered too great for CEE governments (Fischer and Gelb, 1991). More importantly, privatization was seen as essential to broader stabilization and economic growth (UNCTAD, 1994). However, this view was often based on a “mythologized” concept of markets, their benefits (Stiglitz, 1993) and, critically, how quickly markets can be established (Ellman, 1997; Kapstein, 1997; World Bank, 1996a).

What are the key lessons from the transition experience that should be considered in devising reform policies? General privatization policies in CEE are clearly important as they form the context for privatization of specific sectors of the economy, including health care. Here I review six fundamental objectives of privatization policies to improve the efficiency of both state and privately owned firms.

### **Objectives of privatization**

The purpose of privatization is to help establish a market economy founded on private property. There is evidence that both private firms and SOEs can both operate profitably in richer transition economies (Pohl, et al., 1997; Brada, 1996). Other researchers make important distinctions between new private firms (usually small) and former SOEs (usually

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<sup>1</sup> Privatization in Yugoslav successor states has a small presence in the published literature due its low priority during war and disintegration of Yugoslavia and also to the lack of program evaluations.

large). They argue that new startup firms in Poland and the Czech Republic have higher productivity than formerly state-owned firms and are a significant source of economic growth. (Murrel, 1996; Ellman, 1997; Johnson and Loveman, 1995). However, such studies conducted at the individual firm level do not get at the question of whether asset sales alone achieve the goal of privatization and may also be subject to significant biases.<sup>2</sup> Furthermore, most observers agree that the sale of state assets to private parties is not sufficient to develop a market economy (Gray, 1996). Focusing all political efforts on the relative simple task of transferring ownership rights from the state to private hands detracts from the hard task of developing market institutions (Murrel, 1993).

The term privatization, using a narrow definition in developed market economies, typically denotes the transfer of public assets to private ownership. In CEE, the term has been used variously to describe different policies from limited introductions of market forces to the total transformation of formerly planned economies. In public services, it has been used to denote contracting of limited services or competition between government agencies (Mills, 1991; Mills et al., 1994; Saltman and Figueras, 1994; Vickers and Yarrow, 1991). More commonly in industrial restructuring, "privatization" identifies methods of transferring state assets to private hands. The basic models of assets sales in transition economies and technical details of the programs, such as valuation tools or the structure of voucher auctions, are discussed in other documents. Following several authors, I adopt a broad process definition of privatization, meaning the development of private markets to explicitly restructure a planned economy into a market economy (e.g., Clague, 1998; Murrel, 1996; Gray, 1996).

This is an enormously complex task; there is no one path to reform. There are however common building blocks – common institutions – that support well-functioning markets. Privatization supports markets by improving the allocation and monitoring of resources and

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<sup>2</sup> There are no true one-on-one comparisons of private and public firms for several reasons: a) better performing firms have been privatized first; b) poorly performing SOEs have often been liquidated or looted; c) the capacity of new private firms is not subject to the overcapacity of former SOEs and is instead conditioned by market conditions at the time of start up; and, d) private owners have been in place for too short a time to effectively restructure the former SOEs (Brada, 1996).

the transparency of incentives. The degree to which these functions do improve depends on a number of factors:<sup>3</sup>

- role of government,
- financial discipline,
- competitive markets,
- effective corporate governance,
- property rights regime, and
- political support for the reforms.

These are discussed below.

**Establishing the Long Term Government Role** One of the ironies of private sector reform in CEE is that the government need to be deeply involved in the process of developing a market economy. Where their prior role was in subsidizing firms and centralized decision-making, during transition governments now must build market institutions and eliminate supports for failing firms. These tasks are highlighted below. In the long run, the government will carry out the “traditional role” of government in a market economy; regulating to control market failures and coordinating to leverage private resources in helping meet national goals. Establishing this role can be difficult. The sale of SOEs, for example, may result in large private monopolies that are subject to only minimal governmental regulatory capacity compounded by a weakened ability to remain independent from the powerful new business interests.

The health care sector is characterized by a number of endemic market failures where the regulatory role of government is well understood. Many CEE countries are increasing the government’s role even further by following the Western Europe norm of national insurance systems. As they introduce market forces and health insurance to the health sector, CEE governments must build capacity for a number of new tasks including: regulation of insurance markets, meeting public health goals with private provision , enacting effective and

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<sup>3</sup> Particular features and their relative importance depend on industry characteristics. For instance, not included above are foreign trade and investment that are important in allocating and monitoring resources in many industries such as pharmaceuticals. In health care provision, certainly PHC, direct foreign involvement is not

transparent quality assurance procedures, and establishing cost control measures along with new financing schemes (Saltman and Figueras, 1997). These long-term responsibilities are in addition to the tasks of transitioning to a market-oriented system.

**Imposing Financial Discipline** One of the central failures of the SOE system are ‘soft budget constraints’ (Kornai, 1980). Financial discipline is fundamental to firms in a market economy and, as Brada’s findings suggest, former SOEs can positively respond to it also. Other studies show that when under hard budget constraints SOEs adjust workforce levels in response to changes in revenue, more effectively collect receivables, better link investments and profits, and move from output objectives to profit maximization. (World Bank, 1996a). The credibility of “non-bailout” policies, however, is critical to maintaining financial discipline, governments must keep commitments to end subsidies (Roland, 1997; Stiglitz, 1993). If managers expect that they will continue to receive subsidies, official non-bailout policies will have little effect. Early reform experience has borne this out. Pohl et al.(1997) found that in 7 CEE countries over 1992-1995 poor lending practices were strongly associated with state-ownership, indicating that state subsidies continue. Recently, leading reform countries like Poland and Czech Republic have been rewarded with significant growth after cutting direct subsidies and reducing bad loans to SOEs. Tax breaks though, are proving harder to eliminate and are an avenue to subsidy. In Russia for example, tax subsidies to large firms have actually increased and ad hoc tax breaks in collusion with politicians have proliferated (World Bank, 1996a).

One of the primary aims of physician payment reforms in CEE is to improve incentives for efficiency and quality in care provision and to control overall spending (Saltman and Figueras, 1997). Many reformers are moving from a system of salaried, state-employed physicians to one emphasizing contractual relations with practitioners who are paid by capitation, fee-for-service arrangements, or a mix of these systems often supplemented with a salary component. Romania and Poland, are cases in point in that they have several demonstration projects with different mixes of payment plans (Saltman and Figueras, 1997).

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significant. However, as the transition proceeds, foreign partners may find a role in capital financing for in-patient facilities or operating managed care firms.

The focus of reforms is currently on physician payment. Capital financing of clinics, however, is also an important concern, especially in countries with underfunded public clinics and severe budget problems. As policies shift from state subsidies to market-oriented financing banks will play a central role in pooling, allocating, and monitoring resources. The extent of a banking role in funding CEE health care capital investment is uncertain. Nonetheless, if private resources are increasingly relied on to improve the quality of care, private actors will eventually turn to banks for financing. However, banking systems across CEE are in very poor shape and are saddled with large non-performing loans dictated by former governments (Borish, 1996; World Bank, 1996a; Lavigne, 1995). Compounding problems of insolvency, banks have little experience allocating funds in a risk-filled environment, having previously been mere recorders of transactions (Stiglitz, 1992).

**Building Competitive Markets** Competitive (or contestable) product and factor markets are necessary for incentives for efficiency and quality improvements (Brada, 1996; Stiglitz, 1992; Vickers and Yarrow, 1991). In CEE there is evidence that private firms can outperform SOEs in conditions of highly competitive markets (Vickers and Yarrow, 1991). This only emphasizes the credibility of non-bailout policies and ensuring equivalent expectations of non-bailout for private and public sector managers. Another important issue is freeing the paternalistic labor market policies lingering from the communist era including fixed wage structures, restrictive hiring and firing policies, and disincentives to employment must be changed to improve labor mobility and efficiency. (Borish, 1996; World Bank, 1996a).

A central tenet of the case for privatizing is that competition will improve quality of care and patient satisfaction as providers work to keep patients (Preker and Feachem, 1995; World Bank, 1993). Lowering barriers to entry and exit enhance competition and allow the private sector to experiment with organizations and relationships that are most effective (Borish and Noel, 1996; Vickers and Yarrow, 1991). This may be important in CEE where the dominant organizational form was large, state-run clinics and will allow private providers to develop effective models of group practices.

**Encouraging effective corporate governance** Resolving corporate principal-agent problems is made more difficult in CEE as there are few effective mechanisms for monitoring and enforcement (Brada, 1996; Gray, 1996; World Bank, 1996a). In early years of transition, direct monitoring is likely to be most important and managerial capacity grows and stock markets develop which can also evaluate managers' performance. An extensive study of CEE firms supports this, showing that those with more concentrated ownership, especially by banks, is associated with more extensive restructuring (Pohl, 1997). While there is little that governments can do directly to advance these private sector developments, government action in three areas help improve governance.

Three strategies or policies would lead to better governance. One would be to make it possible for owners to change managers by freeing rigid labor laws from the previous era (Borish and Noel, 1996). A second important role for government is establishing effective bankruptcy laws and enforcement mechanisms that facilitate closure of inefficient firms and build creditor confidence. Finally, governments need to depoliticize industry. Some authors argue that the main governance problem in CEE is not managerial discretion but "political discretion" and the continuing influence of the government over private decision-making (Boycko et al, 1995). Such influence includes political favors, kickbacks, and favorable regulatory action. This problem is especially difficult with weak central governments that can't control powerful bureaucrats and enterprise managers seeking favors (Shliefer and Vishny, 1993).

**Defining and Enforcing Property Rights** The property rights regime, the foundation of privatization, is especially weak in CEE. It suffers from two basic problems: 1) definition and protection of property rights and, 2) establishing ownership rights prior to sale. Definition and enforcement of property rights rely on legal constructs which must be established, in many cases, from first principles (Rapaczynski, 1996). Distinctions such as cash flow rights, control rights, or split rights were not even recognized in most of CEE (World Bank, 1996). Once rights are defined, protection mechanisms must be developed quickly for privatization to succeed. Current legal systems are complex and arbitrary, raising transaction costs for basic procedures so high that only the worst violations of private property are pursued legally (Rapaczynski, 1996). Governments must establish legal

definitions of property rights, privatization procedures, rules for post-privatization sales between private parties, and clear legal protection of private property. Enforcement mechanisms must also be established. But here the government role is limited; enforcement in practice infrequently requires initiation of legal proceedings. Property rights are enforced only on the margin in developed market economies. Instead, private self-enforcement is relied on; with mechanisms based on professional reputation or multi-lateral arrangements overseen by trade groups (Rapaczynski, 1996; Rubin, 1993). In health care, the analogs are medical trade groups and professional physician associations.

The second major problem arises from the “confused” property rights inherited from the communist era (Uvalic, 1992; Winiecki, 1990). The state, enterprise management, workers, and citizens all had various claims to state assets in varying degrees from country to country. To solve some of the legal problems these claims pose, many laws on privatization have effectively re-nationalized assets to enable subsequent sale. However, the political problem remains—these multiple claims to state property have greatly complicated privatization and heightened the political sensitivity of the process (Uvalic, 1992; Winiecki, 1990; Lavigne, 1995). One problem that can be anticipated is if municipal governments are not involved in the sale of “nationally-owned” municipal-level health care facilities.

**Gaining Political Support for Privatization** Policy reform is an inherently political process as it seeks to alter the distribution of goods among different groups. Privatization is especially politically charged due to the very clear distributional consequences of transferring state assets to profit-seeking private parties. Thus, tension between the goals of economic efficiency and distributional equity often drives the design and implementation of CEE privatization policies. It is also central to gaining the social and political consensus required to sustain long-term reforms (Fischer and Gelb, 1991). Faced with often politically powerful groups, most reformers seek to maintain or achieve political support by selling assets at near give-away prices. Britain in the 1980's, for example, sold public shares in state monopolies at deep discounts to boost political acceptance of the program (McAuley, 1993).

A similar model has emerged in CEE though the group gaining from the process is largely firm insiders; state assets are sold at low or no cost to managers or to management/employee

teams with management as the dominant partner (Lavigne, 1995; Boycko et al., 1995; Mosley et al., 1991). While CEE enterprise managers are inexperienced at operating in a market economy, they are adept at manipulating the state planning system (Lieberman et al., 1995). Where they are strong enough, they have effectively directed the course of asset sales and have generally maintained control of SOEs, particularly against potential outside investors (Frydman and Rapaczynski, 1993). In Bulgaria, for example, managers blocked privatization policies until 1995 and have slowed their implementation since. In the interim, extensive "spontaneous privatization" stripped assets and cash from state firms to such a point that the condition of SOEs became a serious macroeconomic problem in 1996 (World Bank, 1996a).

Social sectors have seen very little in the way of widespread asset sales or other forms of privatization. One exception is the Czech Republic's health sector where a vast majority of both outpatient and inpatient facilities have been transferred to private sector ownership (Massaro et al., 1994; Chermak, 1995; Cheska, 1993). Clinic values were set at book value and were transferred by direct sale or open bids. Building on this transparency, new owners accepted extensive obligations to provide certain types of care (usually preventive or high cost) and to care for patients regardless of insurance status (Chermak, 1995).

One clear lesson from privatizing reforms is that forceful leadership within the government is crucial in overcoming bureaucratic interests. Ministerial branches of national governments had a great deal of control over SOEs and often ostensibly "owned" enterprises with strong ties to enterprise managers. Thus, individual bureaucrats perhaps have the most to lose in privatization, and in many countries have not relinquished control (Gordon, 1998; Lieberman et al., 1995; Boycko et al., 1995). Strong central leadership was important in the Czech Republic and Poland, even in the first round of asset sales in Russia, to maintain and defend the programs against entrenched interests of bureaucracies (Ewing et al., 1996; Lieberman and Rahuja, 1995). The importance of central leadership in CEE is echoed by the experience of the privatization programs in Mexico and Chile where strong central government action was able to push privatization programs (Przeworski, 1988; Bartlett, 1992).

## **4. Private Sector Policies – Description and Evaluation**

Incentive structures in the health care sector are central to both the behavior of physicians and the effectiveness of policy reforms. These incentives are established by, and embedded in, the institutions of the health sector; the organizations, laws, informal rules, and the relationships between them (e.g., North, 1991; March and Olsen, 1989). As the previous chapters describe, reforming these institutions and developing new ones for the task of maintaining a market-oriented economy are the heart of CEE reform programs.

This chapter examines the incentives faced by PHC physicians, and private physicians in particular. It describes policies governing PHC and the private sector, both currently and those proposed by the reform program and delineates the economic and regulatory incentives that determine physician behavior. The description of the existing policy environment provides the essential context for interpreting the results of the quantitative analysis contained in later chapters.

Following the summaries of current and proposed PHC policies, I adapt the objectives of privatization (outlined in Chapter 3) to the specific case of the Macedonian health sector. Thus, this review highlights specific issues that successful reforms must address and also provides guidance in designing and implementing the privatization reform program.

### **INFORMATION SOURCES**

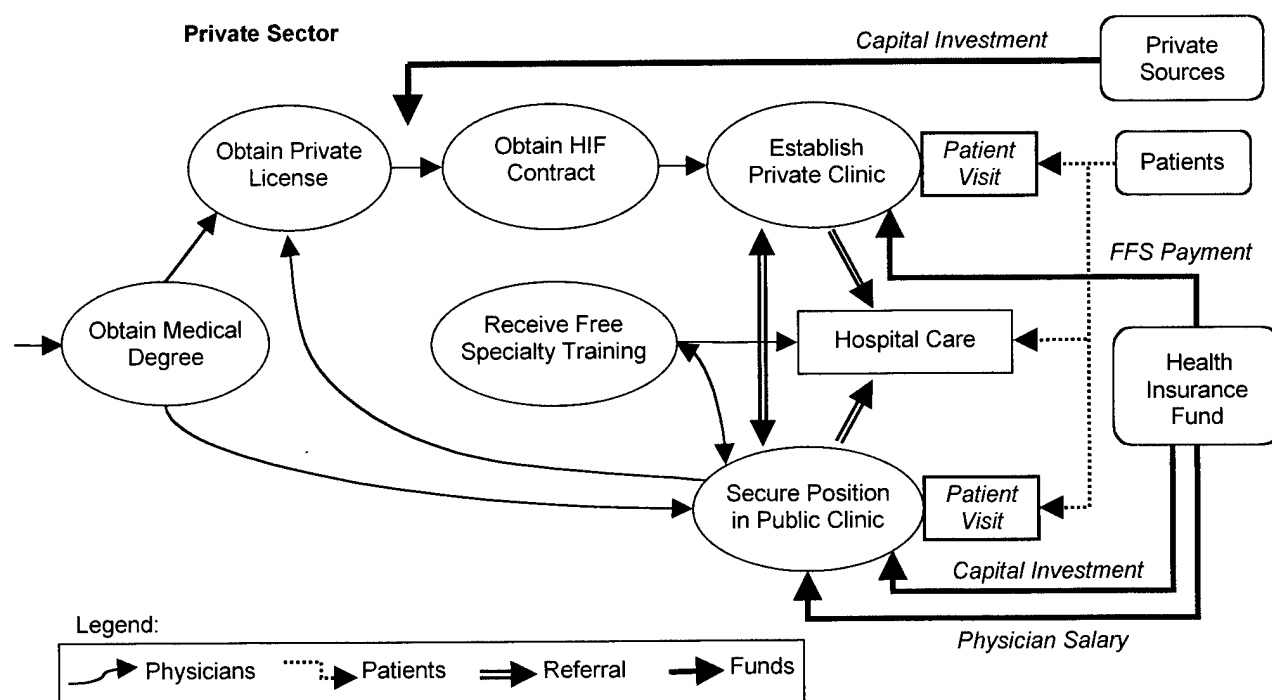
Descriptions and analyses of the emerging private sector are based on several primary information sources gathered for this research. First of these is the Capitation Evaluation Program (CEP) Facility Survey (described in detail in Chapter 5) which provides basic descriptors of private providers. Second are elite interviews conducted with heads of several important organizations: two Ministers of Health; the Director and former Deputy Director of the HIF, and directors of two HIF branch offices; President of the Medical Chamber and President of its affiliate, the Sub-chamber of Private Physicians. These organizations also provided access to official communications concerning their efforts to influence policy. Finally, I conducted structured interviews with 20 private physicians and owners of private

clinics from the CEP municipalities and the capital, Skopje, to gain a deeper understanding of the issues faced by physicians entering private practice.

## PRIVATE PROVISION OF HEALTH CARE

The relationship between private sector providers and other segments of the Macedonian health sector are complex. These relationships, including the process of establishing a private practice, are governed by many rules and regulations not directly addressed by the reform program. To facilitate a discussion of this policy environment and its relevance to the success of further privatization, a system model of private and public PHC is shown in Figure 4.1, depicting flows of physicians, patients (and referrals to non-PHC), and funds from the HIF. Individual policies and processes depicted in Figure 4.1 are introduced briefly here and described in detail in following sections.

**Figure 4.1 – System model of private and public PHC**



Upon completing medical training a physician may enter either public or private sector practice; dual public/private practices are not legal. However, reflecting the transitioning nature of the health sector, the most common entry path to the private sector is via public

sector practice. An important factor driving this is that, as discussed in Chapter 2, obtaining specialty graduate medical training is highly prized by physicians. Since public sector physicians may receive free graduate training, securing a position in a public clinic is often the preferred career choice of young physicians.

To enter the private sector, physicians must first obtain a license to practice privately from the MoH. With a license physicians may then apply for a HIF contract to provide PHC reimbursed on a FFS basis. Over 90% of all practicing private physicians have contracts with the HIF. A considerable part of establishing private practice is financing capital investment for the clinic itself. The arrow indicating the flow of capital resources to private clinics shows that investment occurs prior to obtaining the HIF contract. This reflects the fact that a clinic must be shown to meet minimum physical requirements before a contract is granted.

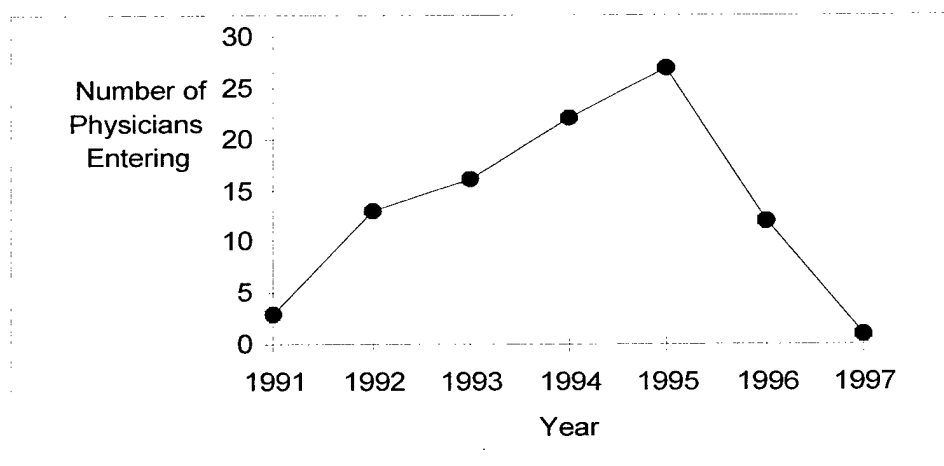
Fund transfers from the Health Insurance Fund to public clinics are depicted in Figure 4.1 as Capital Investment flows and Salary flows. Fund transfers from the HIF to private clinics are FFS reimbursements. Patient flows are shown in Figure 4.1 as entering either public or private PHC clinics or as presenting at public secondary and tertiary care clinics; this reflects the fact that the gatekeeping function of PHC physicians is new and it is not clear that it is enforced. Patients also may obtain public secondary and tertiary care via referrals from PHC physicians.

### **Growth of Private Sector**

The private sector in 1997 consisted of 380 physicians licensed to practice privately (refer to Table 2.1). However, the MoH records on which this is based are limited as a source of individual level information on physicians in actual practice. It lists those that have licenses to operate and does not reflect physicians whose clinics have closed since registration.

Drawing on a census of 94 private doctors conducted in 8 municipalities across Macedonia (approximately 25% of all private physicians in Macedonia), Figure 4.2 shows the number of physicians that entered private practice each year from 1991 through October 1997.

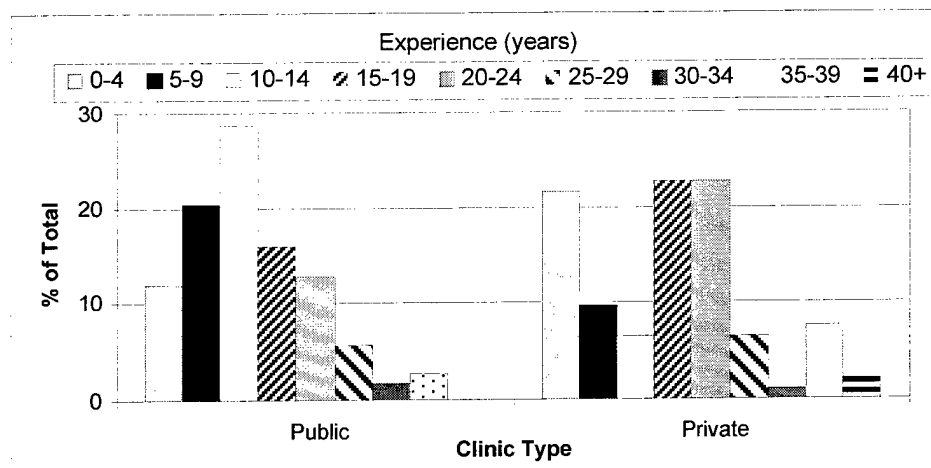
**Figure 4.2 – Private practice growth trends in 8 Municipalities**  
(of those open in Oct 1997)



Growth was steady the first 5 years, rising to a high of 27 physicians entering private practice in 1995. New entrants fell quickly, to just 2 during 1997 through October. The large drop in observed number of entrants may have arisen in part if recently opened clinics exit the sector at a higher rate than other clinics. Comparisons with MoH and municipal Medical Center registries of private physicians show that only about 8% of private clinics closed during 1996-1997 (see below).

Private practice has drawn physicians with widely differing levels of experience. Figure 4.3 depicts the distribution of the years of experience of individual PHC physicians in both sectors. The experience level of public physicians exhibits a smooth distribution with a plurality of physicians in the 10-14 year range. The private sector curve shows at least two distinct groups: younger physicians with less than 10 years experience and older physicians with 15 or more years.

**Figure 4.3 – Distribution of years of experience, public and private physicians.**



These results reflect the careers of those private physicians participating in the structured interviews. Respondents fell into two general categories. First were the experienced doctors who practiced for several years in public clinics. Several served as heads of clinical departments prior to entering private practice. Most of these were popular physicians in public practice whose private practices reportedly grew quickly as their former patients sought care in their private clinics. One, formerly a leading figure in the local hospital, had a roster of over 4,000 patients in his first year of operation. The second, smaller group consisted of young doctors with little or no experience prior to entering private practice. This mirrors private respondents of the Facility Survey in which a substantial minority (22%), all young, had only practiced in the private sector. Many in this group reported that they could not find jobs in the public clinics, some even after “volunteering” for several years.<sup>1</sup> These younger doctors are more likely to work as employees in clinics owned by another physicians. In Skopje, with the largest population of unemployed physicians, physicians are required to pay a “deposit” of up to 2000 DM (1500 USD in 1997) to secure employment at some private clinics. This practice reflects the extent of the physician labor surplus in Skopje.

Two important groups of physicians are not represented in Figures 4.2 and 4.3. First, are those physicians that entered *and* exited private practice prior to the survey. This group is

<sup>1</sup> Volunteering is a common practice as young physicians gain experience and clinics receive free labor.

likely small. Of the 122 private physicians identified as potential respondents in the Facility Survey<sup>2</sup>, a total of 28 were not in practice at the time of the survey: 18 of those were on leave, had retired or were deceased. The remaining 10 physicians (8% of the sample frame) had left private practice. However, not all private clinics that do close actually cease operations entirely. Occasionally, clinics will “pause” due to cash flow problems and reopen when conditions improve; there were six such clinics in the original sample frame for the survey. Second, there are those that have not overcome the barriers to entering private practice. Several public physicians reported that they or their colleagues were deterred from establishing a private practice for a variety of reasons. As we show below, significant barriers to entry do exist which introduce distortions into the developing health care market.

### **Private Sector Policy Environment**

Growth of the private sector depends to a high degree on government policies (Orosz, 1995). That is, policies establish the barriers to entry and fix expected income for physicians considering entry into private practice. For example, the government pay freeze in the public sector and relative benefits of FFS payment over salary are large inducements to enter private practice. Government policies can also affect the demand side by setting fees and, indirectly, in the relative quality of public clinics. As in other low- and middle- income countries, development of these policies has been non-strategic and haphazard (Bhat, 1993; Bennet, 1992). Rather, policy toward the private sector has been developed incrementally in response to growth of private provision the continued poor condition of public sector finances. The policy environment that has emerged is mixed in its effectiveness. On the positive side, however, Macedonia has avoided some of the pitfalls of private sector provision other low-middle income countries have made such as: allowing dual public/private practices; doctors selling medications that they prescribe; lax licensing resulting in poorly qualified practitioners; and, unregulated laboratories (Berman, 1997; Bennet et al., 1994; Bhat, 1993; Roemer, 1984).

This is a significant achievement. But, as we show, policies in the Macedonian health sector have also lead to market distortions, reduced overall efficiency and often hampered the

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<sup>2</sup> The sample frame was drawn from registries of private physicians from the MoH and local Medical Centers; see (Nordyke and Peabody, 1999).

ability of the private sector to advance national health goals. Left unaddressed the layers of policies may obstruct further reforms.

**Health Care Law and Sublaws** The Health Care Law and Sublaws (regulations promulgated by the Ministry) establish the basic regulatory foundation for private practice. The MoH controls licensing for private practice. Licensure is conditioned on meeting minimum requirements, the first of which is an appropriate medical degree. Secondly, private clinics must meet the same minimum facility standards set for public clinics. Sublaws define sanitary standards, equipment and staffing level requirements for all clinic types. Provision is made for physical inspections and standards are enforced rigorously in private clinics. However, standards are not enforced in public clinics. Preferential standard enforcement may lead to differences in structural quality between the two sectors.

The physical plant standards and minimum equipment requirements private clinics necessitate an initial capitalization estimated at 20,000 DM. Due largely to the low pay of physicians in CEE, financing private clinics is a significant barrier to private practice, as has been noted in even in the richer Czech Republic (Chermak, 1996). The situation in Macedonia is more prohibitive. Over 1 billion USD of Macedonian deposits have been stranded in Belgrade banks since independence, depressing available capital and eroding faith in banks. Individual physicians considering a bank loan face 6 month terms, 20% interest rates, and up to 100% collateral; onerous terms for the purchase of medical equipment. Similar to other CEE countries, access to bank loans is eased for those with the right political connections (Hersch et al., 1997). Consequently, most private physicians self-finance or rely on donations of wealthy friends. The equity implication is that only affluent physicians can afford to enter private practice. These regulations help ensure a level of quality of care in private clinics. However, coupled with the poor condition of the financial system in Macedonia, these place barriers to entry to private practice that call into question the ability of privatization to leverage significant amounts of private resources to advance national health goals.

**HIF Contract** Contracts to provide reimbursable primary care are awarded by the Health Insurance Fund, with final decision authority resting with the HIF Director. Fee-for-service

contracts are written with individual physicians and follow the German model in that HIF rules define a list of allowed services and corresponding values for each service item. Private physicians are not allowed to provide preventive services, such as immunizations. Each physician-day is allotted a fixed number of minutes, with different types of patients consuming standard amounts of time. For example, a patient in for a follow-up visit counts as 15 minutes against the total of 480 minutes in a day. This effectively limits the number of patients each physician can see (or be reimbursed for) each day. These procedures are monitored by HIF branch offices which collect and review invoices and approve charges to be reimbursed by the HIF. Branch offices have discretion to make changes in the list of allowed services, and have done so retroactively without notice in some municipalities.

A significant barrier to private practice arises from the requirement that private clinics be shown to meet the HIF minimum physical standards before a contract is granted. This effectively means that the full financial investment in a private clinic must be made prior to generating income by providing HIF-covered care. With the condition of financial markets in Macedonia, this places a large risk on prospective private physicians and may restrict the number of physicians entering the private sector.

The HIF contract is virtually necessary to practice as a private primary care physician. The HIF does not keep track of information on physicians with contracts. However, 1997 survey data showed that 93% of primary care doctors had contracts and another 5% had them when they entered private practice. In the structured interviews, all private PHC physicians had contracts at the time of the interview or had contracts in the past and also relate that a contract is essential for sustaining a successful practice. Indeed, both public and private physicians in the facility survey reported that over 90% of patients had insurance coverage through the HIF. Reflecting the centrality of the HIF contract to their practices, private physician consistently volunteered information on contract cancellations, denials of new contracts, and delays in reimbursement.

The few doctors that did not have contracts had them canceled in the previous two years. During the first years after legalization virtually all eligible applicants received contracts and reimbursements were prompt, helping to fuel growth. But by 1996 growth in the private

sector began to slow, concurrent with deepening insolvency of HIF. Physicians who experienced cancellations reported only vague notifications of what violations they committed. As evidence of the lack of violations, they cited that the MoH did not rescind their licenses to practice privately. Many more physicians complained that their efforts to obtain an additional contract for their offices had failed. All had hoped to hire another physician to expand their practices into unused office space or to reduce their work hours. Contract cancellations are difficult to deal with due to the lack, or cost, of legal recourse. A grievance board was established by the HIF to handle physician complaints. The Director of the HIF, however, disbanded this in 1996. The remaining avenue is the legal system, which is so costly and time-consuming that only the most egregious infractions are pursued (Rapaczynski, 1996). Arbitrariness of reimbursements and contracting procedures are not unique to the Macedonian HIF; Orosz (1995) calls the Hungarian system “highly discretionary” and unstandardized.<sup>3</sup>

Delays in reimbursement from the HIF are also a common complaint. Legally, terms are 60 days, but by late 1998, reimbursement delays had increased to 6 months, putting many private clinics at risk of closure (Ilievski, 1998). Several of the physicians interviewed also mentioned the discretion of HIF branch offices in making changes to allowed services, denying charges and not informing physicians of this until reimbursements are made.

Together, MoH and HIF rules and regulations define much of the policy environment of the private sector. However, other policies and practices, often established at lower levels of the health sector, also have important effects on growth and performance of the private sector.

**Referrals.** Referral policies, which are generally established by local Medical Centers, extend the bifurcation of the two sectors into clinical practices. Private physicians, for example, cannot see their patients while in hospitals. This has clear implications for private practice. First, this rule makes private practice less attractive to potential patients, especially those patients who feel they may be more likely to require hospitalization. It is also a disincentive for private physicians to refer for in-patient care. Many of the private physicians interviewed noted that they often “lose” patients they refer for inpatient care since, without

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<sup>3</sup> In this regard, Transparency International's 1999 Corruption Perception Index rates Macedonia 63<sup>rd</sup> of 99

private physician access to hospital medical records, the patients require follow-up care available only from their new public doctor.<sup>4</sup>

Outpatient referrals between public and private physicians are also restricted. Many Health Centers forbid public doctors to refer patients to private physicians. In one urban Health Center, public primary care doctors are subject to financial penalties and possible dismissal if they make referrals to private specialists. Even where referral prohibitions are not explicit, referrals from public to private are low.

**Education.** The HSTP reform program proposes several changes that involve medical education. One of the priorities is to reduce the oversupply of doctors by cutting enrollment in medical school (World Bank, 1996b). Also, there is an emphasis on enhancing the status and quality of PHC education. In the existing system, specialties are overproduced and GPs and family practice physicians are undervalued. The greatest effect is a misallocation of resources, but this also has consequences on the growth of private practice. There are two components to this problem. First is undergraduate medical education. The Medical Faculty has reduced enrollment in fully subsidized education to the recommended 110 (Nurdyke and Peabody, 1998). However, they also accept an additional 110 students who pay full tuition. Often these are more wealthy students who do not qualify for the competitive scholarship positions. The second main problem is that specialty post-graduate education is free for those public doctors nominated by their clinic. Many young physicians serve in Health Centers only waiting for a specialty education position to open. Private physicians, conversely, must pay out of pocket for specialty education. Owners of several clinics cited this as a problem in finding highly capable physicians willing to work as GPs in private clinics.

The ultimate results of these policies are an oversupply of specialists and a reduction in the attractiveness to GPs of private sector practice. Therefore, young physicians tend to seek out public sector positions leading to specialty education which may allow them to enter the private sector as a more highly paid specialist.

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countries surveyed.

<sup>4</sup> PHC physicians in Macedonia do not treat patients in hospital. However, public physicians have access to hospital medical records and are able to provide follow-up care.

**Discrimination.** Patients of private doctors are discriminated against in public clinics, a practice not uncommon in poor countries (Thomason, 1994). Patients of Macedonian private physicians are treated with animosity, are refused care, or given poor quality care in public clinics. Discrimination occurs in public pharmacies too, where patients of private doctors are often told that their prescription, which would be covered by insurance, is unavailable and that they must purchase it out of pocket at a private pharmacy. Several public sector providers cited patient discrimination as a strong factor discouraging many of their public sector colleagues from establishing a private practice.

Private physicians also report resistance from their public sector colleagues. A common public clinic practice noted by several interviewees is assigning a patient of a private doctor to a public doctor if the patient visits a public clinic for a school medicine check or emergency care. Some private-sector respondents felt that if their practice failed they wouldn't be hired back in public sector clinics, though in one study municipality there was one instance of a public doctor who previously operated a private clinic for two years. Private specialists also noted instances of the MoH thwarting private sector initiatives to develop cardiac surgery and in-vitro fertilization services, two specific items that the capital clinical centers and Ministers have been actively pursuing for several years.

### **Evaluation of Existing Policy Environment**

Disparate policies between the public and private sectors are common, and perhaps even be justified, in transition economies. Such policies, however, appear to hinder the functioning of the private sector and do not advance the goal of improving the overall efficiency and quality of the national health system. This section evaluates the PHC policy environment with respect to the demands of introducing market forces into transition economy health sectors and identifies key areas for improvement.

**Role of Government** The current health Insurance Fund rules effectively control provided services and numbers of patients seen by private physicians, which may counter the expected tendency of private doctors to simply and quickly process patients to increase income (known as churning). However, the fundamental problem of overprovision in a FFS system remains (Miller, 1996). Branch office HIF actions, while arbitrary, can be seen as an attempt

to control rising costs due to supplier induced demand or to cut HIF expenditures in a period of growing deficits.

MoH rules preclude private physicians from providing vaccines and childhood immunizations. This complete reliance on state provision of public health goods pre-empts any leveraging of private resources to advance public health goals. Quality and efficiency could be improved by establishing competition between private providers allowed to also provide a basic public-health oriented services. Fair and equal enforcement of standards would further ensure high structural quality in both private and public clinics. However, safeguarding against using inspections as a coercive tool or uneven enforcement would have the opposite effect and maintain the poor condition of all clinics.

There is very little integration of services across the private and public sectors: policies on referrals, inspections, discrimination, and pay differentials all contribute to separate and unequal systems. At the municipal level, referral policies, especially denial of hospital privileges to private physicians, may unnecessarily burden the public system. This problem may arise if less healthy patients, knowing that their private physician cannot see them in a hospital, self-select into the public system if they believe they require hospitalization.

In the Public sector there are several additional important failures of policy including: 1) oversupply of physicians and weak mechanisms for allocating human capital within public clinics; 2) symbolically low co-insurance and extensive exemptions that reduce demand-side incentives for efficient utilization; and, 3) there is very little integration of services across geographical regions and tiers of the public system that negatively impact allocative efficiency.

**Financial Discipline** Current rules are effective in forcing private clinics to exercise financial discipline. However, in Public clinics, managers and physicians have little or no incentives for financial discipline in the use of resources in public clinics. Managers' incentives are distorted by the arbitrary allocation of funds from the HIF and by the politically appointed nature of Medical Center management councils. Physicians' incentives are severely constrained by their low salaries, lack of any meaningful performance review, and secure job tenure. From the standpoint of improving efficiency in health care provision,

financial discipline is central to the reform program and will be considered in more detail in later chapters.

**Competitive Markets** There is competition between physicians within the private sector. Increased entry barriers due to contract problems, education subsidies to public doctors, patient discrimination and professional pressures, may have restrained the level of competition, however.

In terms of competition between the private and public sectors, HIF rules can be seen as restricting entry to the private sector and, coupled with referral and hospital privilege policies, constraining the competitiveness of physicians once they do establish private practice. The result is that there is no effective competition between private and public sector physicians. Fixed salaries, and rigid hiring and firing policies preclude competition. Furthermore, neither physician utilization or patient selection of doctors has any effect on job performance or pay. With the establishment of the private sector in 1991, there have been shifts in demand toward private doctors. However, this has not resulted in effective competition between public and private sectors in part because public clinics have not reacted to this shift in a positive way by raising quality. Rather, public physicians are seen as protected from competition by HIF limits on private sector growth and Medical Center rules that also constrain private practice.

These practices are not unique to Macedonia. The HIF attempts to protect public sector physicians are analogous to those of the American Medical Association prior to the 1975 Anti Trust case (Costilo, 1985). The "medical monopoly" limited price competition between physicians and was seen as protecting jobs as well (Kessel, 1958). Now, however, U.S. practitioners recognize competition as a positive force for efficiency and quality. They have responded with longer hours and less waiting time to improve patient satisfaction. Also, innovative forms of clinic organization and service delivery have been experimented with to improve both efficiency and quality (Costilo, 1985).

**Corporate Governance** Many private clinics are proprietorships or partnerships (over 90%) and thus there are few principal/agent problems in terms of managing private clinics. Until recently, public clinics were managed by the old-style management councils that in 1998

were changed to politically appointed management boards. In addition, politicized management hinders effective governance as managers have incentives to ensure tenure and secure fund allocations from the MoH rather than by focusing on efficiency and quality in the clinics. Health Center responsibility and authority are further diluted as they report administratively to Medical Centers.

**Property Rights** The right of physicians to privately own the physical clinics and related equipment is clear. However, the right to use these facilities is de facto dependent on possession of an HIF contract. That is, the HIF has power to “seize” the right-to-use private clinics and it can exercise this power with little recourse since the HIF Grievance Board was disbanded at the discretion of the HIF director in 1996. As a consequence, the HIF has a monopoly on contract awards, complete discretion over the contracts, and little or no accountability in its decisions.

**Political support** Unlike large scale privatization of state enterprises, the initial limited development of private markets in health care had, and required, little political leadership. As the private sector grew and problems with public finance compounded, the distributional concerns became clear.

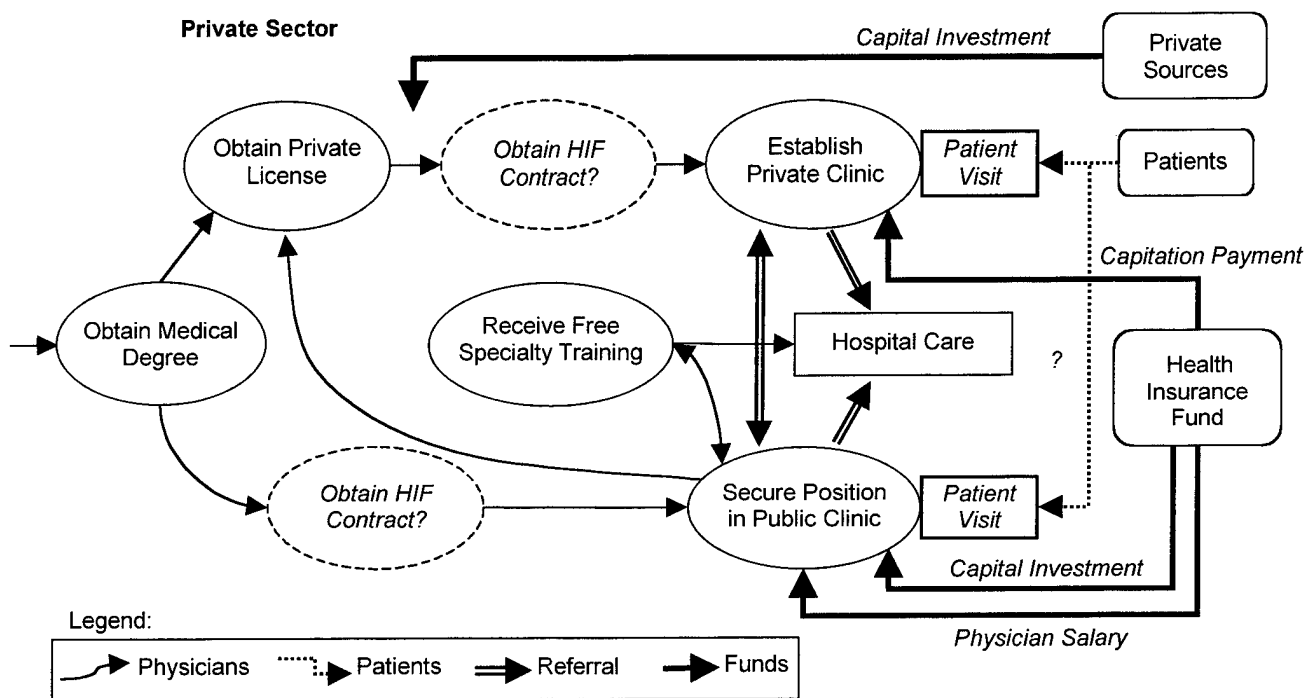
Private practice offers higher income than the national median salaries of public sector physicians. Obtaining an HIF contract is the key entry barrier to achieving these higher incomes. Thus, the current private sector policies create large rents that HIF bureaucrats may be tempted to extract. One prominent physician who had his contract canceled reported publicly that he had been told that his HIF contract could be reinstated by paying a “fee” of 7,000 DM (Tacev, 1996). The HIF may further be threatened with a loss of power if contract granting and review procedures become more transparent and as the flow of public sector funds are directed more by market forces, in contrast to bureaucratic decision-making.

## **PROPOSED REFORM PROGRAM**

The HSTP is developing both demand-side and supply-side strategies to improve the quality and efficiency of primary HC provision across Macedonia. The HSTP program is reviewed in Chapter 2. In this section we discuss the components of the supply-side reforms and evaluate how well they advance to goals of developing markets in PHC provision. These

reforms have the potential for significantly improving the financial incentives to PHC physicians. However, the reform program does not address a number of policy issues that may hinder the effectiveness of the reforms.<sup>5</sup> I discuss these in detail below. As an illustration of this point, Figure 4.4 depicts the PHC system model as defined by the HSTP reforms.

**Figure 4.4 – System model of private and public PHC under HSTP reforms**



The supply-side of the reform program currently focuses on physician payment incentives, resulting in little fundamental changes in the system of PHC provision.<sup>6</sup> Of course, if the MoH follows through on preliminary proposals to sell public PHC clinics, the PHC system will be significantly altered. In this study, I examine the more concrete plans for payment system reforms in greatest detail.

<sup>5</sup> That health sector regulations must be revised to meet demands of new payment systems is not restricted to transition economies. In the US, much current fraud and abuse regulation was implemented during the 1970's when FFS payment was the norm. Now, these regulations are inadequate and potentially counterproductive as managed care and capitation have become dominant (Blumstein, 1996).

<sup>6</sup> Continuing Medical Education and limits on the annual number of subsidized medical school students are also including in the supply-side reforms.

The primary changes from the existing policies are that payments from the HIF to individual physicians will be in the form of capitation payments. As discussed below, this does not necessarily mean that payments to current private and public physicians will be comparable. Additional uncertainties include how contracting issues with the HIF will be dealt with. It is unclear whether contracts, similar to current FFS contracts between the HIF and private physicians, will be required by physicians in both existing private clinics and public clinics. How contracts are issued and managed, as in the past, will have major influence on the effect of the reforms. Below, we discuss features of the proposed capitation payment system.

### **Payment Levels and Physician Income**

One of the key outcomes of the proposed demonstration project is information to help establish the level of physician payment under capitation.<sup>7</sup> Pay level is a central issue because it sets the maximum expected revenue for doctors. There are several issues under consideration that determine physician pay. Some features will have little differential impact between the two sectors such as maximum monthly payments to physicians and case-mix adjustments for age and sex of patients. However, other features may have important implications for the functioning of the market under capitation including: creating a base salary component of pay; a provision for outlier payments; disincentives for over-referrals; more sophisticated case-mix adjustment; and maximum monthly payment.

**Salary** Under one proposal, physicians in public clinics will receive a portion of their pay in a fixed salary with the remainder in capitated payment.<sup>8</sup> Private physician pay would be 100% capitation, fully dependent on the number of patients enrolled. As the size of salary portion of public sector pay increases, variation in income due to productivity will decrease. While there are good reasons to phase in radical changes to allow physicians to adjust, this carries the risk of weakening efficiency and quality incentives for public physicians. Moreover, there is also the likelihood of weak incentives becoming a de facto fixed policy as changing it would be politically too difficult.

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<sup>7</sup> Payment level issues are reviewed in Carter et al., 1997.

<sup>8</sup> As mentioned earlier, physicians in low-utilization public clinics will receive a salary.

**Outlier payments** These allowances limit financial risk arising from legitimate extraordinary care expenses. This is an alternative to more administratively intensive risk pools that could be phased in over time as capacity improves (Peabody et al., 1997). While such provisions are necessary to reduce adverse selection on the part of physicians, rules for outlier payments will need to be very transparent and well-defined. Most likely the HIF will be responsible for outlier payment decisions. Significant levels of discretion in making these payments, however, could be used to confer favors on groups of physicians.

**Referral Incentives** Another common component of capitation systems is the incentive to either over-refer or referral more often to costly specialist care. Typically, bonuses or penalties are assessed to limit this practice. These incentives are based on comparisons for physician referrals over a fixed time period to allowable ranges of referral rates. Some portion of the capitation payment is often withheld and released when the physicians meet referral targets for a time period. Penalties for inappropriate referrals may also be used, though the proposal for Macedonia suggest using referral audits be conducted before penalties are assessed. Similar to facility structural standards and enforcement actions, it is important the application of referral incentives and audits be equitable across sectors. Also, if public sector referral restrictions on private physicians continue, private physician referral practices will not be comparable to those of public physicians.

### **Eligibility and Selection**

Coverage under capitation, in terms of the specialties and number of doctors included, will determine the level of potential savings under capitation. It will also indirectly determine the type of services available under capitation. This is true chiefly in public clinics where there is a distinct segmentation between preventive care providers (Labor and School medicine) and curative care providers. Labor and School Medicine providers under the current proposal may be exempt from capitation and retain most or all responsibility for preventive care. If such distinctions persist, the status of PHC will be undermined and integration of the two sectors – and therefore overall system efficiency – will be reduced. Additionally, fairness between sectors will be compromised if private physicians cannot provide preventive care; they will be less attractive to patients and their enrollment may suffer.

Patient selection and switching will also condition potential improvements in competition within and between sectors. In keeping with existing law, current proposals allow patients to switch public physicians once each year, while private physicians can be changed at will. While such open selection of private physicians increases competition and patient choice, the restrictive public sector policies have the opposite effect.

### **Financial Responsibility**

Under capitation, private physicians will continue to assume the financial risks of their practices; costs of operating the clinic facility, capital investment, staff expenses, and other costs of care including lab costs. Private physicians will also bear the costs of specialist referrals. The financial responsibilities of public physicians are different under current proposals. Laboratory costs are one important difference. Many public clinics, especially the larger health centers and polyclinics, have substantial laboratory capacity. Health center budget allocation are made on a department-basis, and laboratories function under separate budgets. Until investments are made in information systems that allow patient-level billing, individual public PHC physicians will not bear direct financial risk for ordering tests. Departments within the Health Center may be able to make some adjustment to physician pay based on lab use, but this too has similar problems with information intensity and weakened incentives.

Facility costs and, more importantly, capital investments are also a critical point of difference. Public health clinics are generally considered to be in poor condition. As reviewed in previous section, this is due both to the lack of funds available and to unaccountable management systems. Even if capitation shifts resources to PHC, with public health center management structure unchanged it is not at all clear that capital improvement decisions will change. If in public clinics those physicians bearing financial risk are not allowed to make resource allocation decisions one of the central efficiency and quality improving mechanisms of privatization will not function.

### **Care for the Uninsured**

Policies on care for the uninsured are a minor point in the proposed payment structure, but it has important equity implications. Those patients who do not subscribe to insurance must

pay out of pocket. Private physicians are able to retain 100% of such payments as revenue. In public clinics currently, clinic management retains all such payments and may not use them for salaries. Under the reforms, if public physicians do not receive part of this payment equivalent to that for capitated patients, they have little incentive to treat the uninsured. It is interesting to note that this is one exception to the general rule of the proposed reforms that favor the public sector over private physicians.

### **Evaluation of Proposed Reform Program**

This section evaluates the policy environment, as defined by the proposed reforms, with respect to the goals of CEE privatization that were developed in Chapter 3. While the reform program is not yet finalized, this analysis points out additional elements of the policy environment that must be considered as part of policies further privatizing primary health care.

**Role of Government** Current reform proposals do not resolve the problem of complete reliance on state provision of public health services. Under reforms, private physicians will still be barred from providing childhood immunizations and vaccinations for all patients. Under capitation, all physicians have equal incentive to provide preventive care to ensure that their patients remain healthy and less costly to care for – one of the key advantages of capitation. Prohibiting any group of physicians from providing this type of care exposes them to an inequitable risk of their patient becoming ill from a preventable disease while also making it more difficult for their patients to get the care they need. Furthermore, this pre-empt, to a large degree, any possible leveraging of private resources to advance public health goals

Another issue unresolved from the current system is the uneven quality assurance role of the MoH and HIF. Regulations and enforcement of standards may keep structural quality (such as equipment and supplies) high in private clinics. However, the interviews with private physicians indicated that inspections may be used as a coercive tool. Also, enforcement is not applied equally, which may help to maintain the poor condition of public clinics. To ensure quality and fairness, enforcement of quality and sanitary standards should be strictly

and evenly enforced for all clinic types, perhaps with lengthy grace periods for under-capitalized clinics to make investment over time.

Integration of the existing private and public sectors, allowing coordinated service delivery and patient flows, is only partially addressed by the reforms. While a uniform capitation payment system for PHC physicians will level performance incentives, the issues that implicitly thwart integration remain. Ending punitive referral policies, hospital privilege denials, educational subsidies, inspection policies, and patient discrimination would allow the private sector to better serve patients and advance national health goals.

**Financial Discipline** The lack of adequate management information systems in public clinics is a challenge to reforms. Until MIS capacity is in place, there is significant potential for induced demand in public Health Centers for services that are subsidized or for which physicians bear no cost. Interim measures, similar to the financial incentives for specialist referrals, may be developed to control test ordering as well.

**Competitive Markets** Capitation has the potential for improving competition within and between sectors to the benefit of service quality. However, the fraction of public physician pay that is based on a fixed salary coupled with public sector labor practices and patient-physician selection periods of one year will weaken competition both within the public sector and between the private and public sectors. In addition, referral and hospital privilege policies could be liberalized and discrimination against patients of private physicians could be eliminated to open the public sector to competition and reduce the discretion of public agencies to shield public sector physicians from competitive pressure.

Competition could also be increased by reducing barriers to entry arising from the financial risk of establishing private clinics. Rather than requiring a private clinic to be fully operational prior to granting of a contract, a probationary contract award could be formalized that would convert to a full contract if physical standards are met within a certain period. Such a probationary period would not allow reimbursement for providing patient care but would significantly reduce the financial risk taken by prospective private physicians.

**Corporate Governance** In the private sector there is no immediate change likely, though if barriers to private sector entry are sufficiently lowered, physicians may begin to experiment further with private group practice organizations, use of non-MD staff, and other practices. In the public sector the key issue is the reorganization of Health Center management and how it will be structured. Financial and clinical performance incentives are separated between management and physicians. Without appropriate controls between physicians and clinic management, the rent-seeking behavior of the HIF may be shifted down to the Health Center level as management will have discretion over allocation of clinic resources. This will entail drawing enforceable contracts covering physician use of nearly all inputs to their practices including office space, staff, labs, supplies, and entrances and waiting areas for patients. Doing so may prove to be a difficult problem if Health Centers remain publicly held, depoliticizing the appointed management boards is crucial. This is particularly so to ensure fairness and transparency if physicians and other services operate on a contractual basis. In a more indirect manner, the government can encourage good governance by developing management capacity through education programs and also fostering an information infrastructure that allows common standards to develop between private and public sectors.

**Property Rights** Macedonia has enacted privatization laws, successfully sold many former state assets, and is building the legal capacity to enforce property rights. Thus, the main issue in terms of clinic ownership is not the legal infrastructure, but the political will to depoliticize clinic ownership and management. One additional property rights issue lies in that HIF maintains discretion over contracts with physicians. It will be important to make HIF transactions transparent and improve accountability.

**Political Support** It is difficult to identify the distributional consequences of capitation before important aspects are finalized. However, early experience of the reform program suggests that there is opportunity to improve support. The HIF will have a large role in determining the function of health markets under reforms, as they have in the existing private sector. Securing their participation is essential to program success. Gaining the participation of physicians is also critical to reform implementation. Some Health Center employees are resistant to reforms since they feel threatened by having their pay based on productivity. Public sector specialists may also react negatively if their income is threatened by a decrease

in referrals or in the numbers of hospital patients. If the ranks and pay of specialists are maintained or increased to gain their support for the reforms, the shift of resources from specialty care expected under capitation will be difficult to realize.

## 5. Physician Production of Patient Care – The Literature

In this chapter, the extensive literature on public/private health care provision in LMI and transition countries provides an understanding of the financial incentives facing private physicians. A review of the medical services production function literature further informs the development of the model of physician performance.

### PRIVATE HEALTH CARE PROVISION

Nearly all lower and middle income countries allow private health care provision to varying extents. Private sectors in some countries are very limited, like Papua New Guinea, where only 18% of all doctors are in private practice (Kolehmainen-Aitken, 1990). Others have a more mixed systems like the Czech Republic with 50% of all doctors in private practice (Healy and McKee, 1997) and India where, in 1988, 49% of all outpatient clinics were privately owned (Bhat, 1993). Private sector provision often consumes disproportionately more of the total health spending than the public sector. For example, while private doctors in 1988 accounted for 17.8% of all physicians in Thailand, private spending on private facilities was 46% of total household expenditures on health in 1988 (Nitayaramphong and Tangcharoensathien, 1994). Also, in 1987 25% of South Africa's population received care from private providers accounting for over 43% of total national health expenditures (Broomberg et al., 1990).

While the structure and spending on private sector health provision varies, what is common to all these countries is that there is no strategic policy for private sector development and private sector provision is poorly integrated into national health systems (Bennet et al., 1994, Newbrander, 1997). One of the major barriers to coherent, effective policy is simply that very little is often known about the characteristics of the private sector and its performance that could be used to structure effective policies (Newbrander, 1997). CEE reformers face this situation. Only very limited studies of market forces in health care provision have been undertaken in the past (Semenov et al., 1996). Most market-oriented health care reforms are pressing ahead with little information on how private providers perform in transition economies. Likewise, the Government of Macedonia and the World Bank are committing to

further privatization and introduction of market forces in health care provision. The present study is unusual in this regard: it seeks to inform the public/private debate and help develop privatization policies appropriate for Macedonia.

### **The Public/Private Debate**

The neo-classical economic argument in favor of private provision of health care is clear. Introducing a profit motive encourages providers to become more efficient in their use of resources as they bear financial risk for their decisions. Furthermore, competition between private providers leads to higher overall quality as doctors strive to attract and keep patients. The advantage to national insurance systems of private provision is that it leverages private resources to reduce the burden on publicly funded care. As well known are the market failures in health care and the case for government intervention.

Health care provision exists in an imperfect market. Information asymmetries between doctor and patient can result in supplier induced demand whereby doctors overprovide services to satisfy patients and raise their own income. Resulting losses in efficiency and quality require regulatory intervention. Health care markets provide both public goods and private merit goods, both of which may be under-produced by private providers, largely since individuals have inadequate incentives to pay for or consume them. Additional concern arises when access to services is based on patients ability to pay; poor patients may receive lower quantity and quality of health care or not have access to care at all. Governments typically intervene to correct such market failures with a variety of mechanisms including free or low-cost state-provided public health goods and financial or other incentives to private doctors for provision of public and merit goods.

These issues take on special importance in low- and middle-income economies as they have limited resources and often have higher public health burdens than richer countries (Chernicovsky, 1995). Countries of CEE also do not want to sacrifice otherwise adequate provision of some public goods via the existing state-run health system. An additional concern is the effect the private sector may have on human resources in the public sector. Public sector pay in poor countries and those transitioning to market systems is often fixed by government policy at very low levels relative to the private sector. This pay gap may

draw doctors into the private sector, leaving public clinics understaffed or staffed with less qualified doctors. Equity is also a concern if private doctors seek higher incomes by providing only discretionary care or locating only in urban areas.

With such clear theoretical distinctions between public and private health care provision, much of the extensive literature is cast in terms of which sector is "better". (World Bank 1996; World Bank 1993; Cichon, 1991; Griffin, 1989). Reality of course is complex; in certain situations public sector provision can be more efficient than private care (Bennet 1991; Broomberg et al. 1990); private physicians do provide public goods such as family planning and childhood immunizations (Berman and Rose, 1996; Leopando, 1988); and, private clinics do provide care to the poor and sometimes are the only source of care in urban slums (Thaver et al., 1998; Yesudian, 1991; Akin et al., 1985).

### **Private Provider Performance**

Considering the ambiguities of the effects of private provision, Rice (1998) suggests that the benefits of health care privatization should be studied empirically. Unfortunately, the supply-side has received little rigorous study in low and middle income countries in contrast to the extensive body of demand-side research in developing countries (see for example, Peabody et al., 1999). As the Macedonian government and the World Bank, and more broadly other transition countries, seek to privatize health care provision, what are the key concerns about the performance of private care? In this section I review the key dimensions used to evaluate private provision in low and middle income countries, using this as a basis to develop a model of physician performance. The literature consistently cites three key features of health care provision to evaluate the relative advantages of public and private providers:<sup>1</sup>

- shift of physicians from public sector to private practice
- quality of care
- efficiency in producing services

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<sup>1</sup> Induced demand among private providers is also commonly noted in developing countries. However, even with rich datasets from developed countries, it is a notoriously difficult issue to study (cites, e.g., Pauly and Rice)

These are prominent and recurring issues in health care research in low and middle income countries. However, their application and results of evaluations using measures based on these variables show great divergence. Much of this can be attributed to the difficulties of research in poor and transition countries. Lack of high quality data are common to all areas of research in such countries (World Bank, 1996 and 1993; OECD, 1991; Caiden and Wildavsky, 1974). Additionally, research contexts vary widely. Research settings in rural areas, urban areas, in countries with a heritage of central planning, or in those with decentralized service structures make comparisons across studies difficult and can limit generalizability. Finally, there is disagreement on which measures to use and only in a few areas, such as equity and structural quality measures, is there consistency across studies.

**Private Physician Supply and Market Entry** Most CEE countries have oversupplies of physicians (Healy and McKee, 1997; Borrisov and Rathwell, 1996; Field, 1985). Coupled with the much higher potential incomes in private practice, this gives rise to two related concerns about the development of private sector provision; 1) location and number of private providers and, 2) attrition of highly skilled physicians from the public sector.

Theory and logic suggest that physicians will locate in areas offering a high quality of life and large patient pools (Rice, 1998). This is generally confirmed by the extensive empirical literature on the geographical distribution of physicians in both rich and poor countries (Hanson and Berman, 1998; Chang and Halfon, 1997; Krishnan, 1997; Olubuyide, 1995; Chiang, 1995; Blumenthal, 1994; Williams et al., 1983; Newhouse et al., 1982a; Schwartz, et al, 1980). There is general agreement among studies that the number of physicians depends strongly on population. Other factors often cited include urbanicity, income, and population education level (Hanson and Berman, 1998; Blumenthal, 1994). However, others have found that private clinics are the only source of care in Indian urban slums (Garner and Thaver, 1993).

At the level of the individual physician, there is concern that more qualified doctors may be drawn by higher potential income to the private sector, leaving the public sector with a higher proportion of younger or less skilled physicians (Healy and McKee, 1997; Berman, 1997; Bennet, 1992). This, however, has not been studied systematically, as there has been little

data available on the characteristics of physicians who enter private practice. One study of the private sector in Thailand provides some evidence of factors encouraging physicians to leave the public sector (Nittayaramphong and Tangcharoensathien, 1994). Low morale in public clinics and a pay differential of up to 700% boosted the size of the private sector from 9.6% to 17.8% of all physicians between 1986 and 1989. There is no information on the relative qualifications of the group that entered private practice.

**Quality** Until recently, quality of care assessments have been a low priority in LMI countries due primarily to greater priorities on increasing coverage and difficulties encountered with inadequate information and poor management information systems (Reerink and Sauerborn, 1996). As a result, there is disagreement in the available literature concerning measures of quality of care (DeGeynt, 1995). Furthermore, few studies include private for-profit providers and hence there is little quantitative support for the claim of higher quality of private care. One common feature though, is the use of the standard framework for measuring quality of health care provision. Use of structural, process and outcome dimensions of quality have been reviewed extensively (Donabedian, 1982; DeGeynt, 1995) and I follow that taxonomy here.

*Structural quality.* These measures include the personnel and facilities used to provide care and their organization. The main advantage to structural measures is the ease with which they are obtained and are quite common in LMI country research (DeGeynt, 1995). Structural quality is not sufficient for better health outcomes, but good structural quality is considered necessary for effective care since it is important to patients' care seeking decisions. That is, patients make care-seeking decisions, in part, on observable features of clinics using these as proxies for process quality (due to lack of an ability to assess process quality) and as predictors of outcome quality. Structural measures are also useful in public private evaluations since these are features that physician/owners can easily manipulate to attract patients (Alderman and Lavy, 1996).

In Ghana, Lavy and Germain (1994) found that structural measures such as number of staff, availability of medications and lab equipment, and facility infrastructure are important determinants of patient satisfaction and demand. Others have augmented staffing level

measures with measures of staff training finding that private mission-sponsored clinics in Gambia tend to have more and better trained staff, which the authors credit in part for higher utilization at these clinics (Fabricant and Newbrander, 1997). Conversely, investigations of qualifications and number of staff in India and Thailand have found that private clinics score lower than public clinics (Yesudian, 1993; Nitayaramphong and Tangcharoensathien, 1994).

Medicine availability was also used as a structural quality measure in a study of utilization in Kenya (Mwabu, 1995). They noted that such measures can be unreliable as quality measures since better clinics that attract a large number of patients may suffer from depleted pharmaceutical stocks. Service availability may be better in this regard as these cannot be depleted, though these measure are seldom used in LMI country research. Exceptions include availability of immunizations in private clinics in the Philippines (Leopando, 1988) and hours that clinics remain open for business (Griffin, 1989).

*Process quality.* These measures evaluate what providers do with patients, and comprise both technical and interpersonal aspects of care provision (Donabedian, 1982). From an economic perspective, process quality measures, thus defined, are measures of physician skill. Process measures are used less frequently than structural measures reflecting difficulties in LMI country research (DeGeynt, 1995). Process quality measures typically entail one of three general methods: written case simulations (vignettes); simulated clients; and observed patient-physician consultations (Peabody et al., 2000).

Thaver et al. (1998) administered vignettes of four minor acute conditions to private practitioners in Karachi to gauge quality of care. Vignette scores were also compared to direct observation. Physicians scored well on vignette diagnosis, but poorly on treatment and advising. Performance in actual interactions with patients was lower, indicating that physician vignette scores did not correlate highly with improved practice, especially in prescribing behavior. Madden et al. (1997) reviewed the use of simulated clients (actors or confederates with true conditions) to evaluate the care given to patients in LMI countries. Of 23 published studies from 1970 to 1994, only two studies surveyed physicians in clinical settings. Both used simulated patients with cold symptoms or sore throats to investigate elements of the consultation; history-taking, physical exam, lab work, prescribing behavior

and other treatments given. One of these two studies compared physician performance with simulated clients to previously administered written exams for similar conditions. Similar to results of Thaver et al. (1998), exam scores were higher than actual performance with simulated clients. Tracer conditions were used in a study of community clinics in Ghana that directly observed physician consultations with patients with cough, diarrhea, or fever (Amonoo-Lartson, 1981). Elements of the care process that were measured included history taking, physical examination, treatment provided and prescriptions written. Performance, evaluated against criteria established by a panel of local doctors, was shown to generally meet expectations.

*Outcome quality.* Outcome quality measures attempt to detect changes in health status due to health care received. Outcome measures for specific interventions are easily defined; for example 5-year survival rates are commonly reported for major interventions such as new cancer treatments. As a general comparison between providers, outcome measures are problematic. Health status depends on many factors including lifestyle, education, income, household and community characteristics, in addition to health care services. Their use has also been limited in LMI countries (DeGeynt, 1995). Exceptions to this employ measurements of children, where observation periods can be shorter. In a study of birth outcomes in Jamaican clinics, Peabody et al. (1996) examined the relationship between birth weight and measures of structural and process quality. They found that process measures, such as examinations and counseling, had positive effects on birth outcomes. Structural measures had no significant effect. In an evaluation of quality of care in Ghanaian clinics, Lavy et al. (1994) used child height and weight as outcome measures.

**Efficiency** Efficiency is problematic to define and difficult to measure in primary health care provision. Furthermore, advocates of PHC and private provision use different definitions of efficiency. Primary health care is promoted as improving the efficiency of health systems by shifting patients from more expensive secondary care to the less costly and more effective primary care setting (Goldzweig et al., 1997; Saltman and Figueras, 1997), thus alluding to allocative efficiency. Private provision of health care, on the other hand, is promoted as improving incentives to providers in their use of resources, thus implying technical (productive) efficiency.

When we consider the productive efficiency of providers problems arise in defining outputs and input measures. In certain situations, it may be adequate to define efficiency without reference to quality. This is often done in reporting aggregate measures of public and private sector performance at the national level of financial inputs and patients served. For instance, payments to the South African private health care sector in 1987 accounted 43.6% of total health expenditures while that sector treated less than 25% of the total population (Broomberg et al., 1990). Contrasting this at the facility level, Smith (1980) reported that public hospitals in Lesotho operated at a cost per patient three times that of private hospitals. Disparities in aggregate per capita cost are typically attributed to either induced demand in the private sector or inefficiencies in the public sector (e.g., Broomberg et al., 1994; Griffin, 1989; Gilson and Mills, 1995; Nittayaramphong and Tangcharaoensathien, 1994). However, in most situations quality and efficiency are related. Without controlling for quality of care, case mix, and other supply factors, it is impossible to compare productive efficiency of the public and private sector.

A second key problem, especially relevant in CEE, is the quality of cost data (Paterson et al., 1997; Caiden and Wildavsky, 1974). Public cost accounting systems in CEE are inadequate and unreliable; health care cost accounting has no resemblance to true costs. Furthermore, public health clinics in most CEE countries still receive a variety of subsidies, from facility operating costs to medications, that further skew cost comparisons between clinics and sectors. These pose severe problems for reliable estimates of efficiency based on cost measures between the public and private sectors.

One study of private and public providers in the Czech Republic avoids these problems to an extent. Massaro et al. (1994) examined computerized insurance claims of the fee-for-service system for all private and public physicians, using medical specialty as a proxy for case-mix. Claims data covered two years: 1992, the end of which saw the legalization of private practice; and, 1993, the first year of private practice. This unique observational design controls for much of the variation among public and private physicians since all physicians in the study were in public practice in 1992. The authors found that private physicians performed more procedures per patient and charged more for both services and supplies. This strongly suggests that, under the same fee-for-service system, private physicians exhibit

lower efficiency than public counterparts and that this difference is due to incentives of private practice.

## PHYSICIAN PRODUCTIVITY

The above review illustrates the current level of understanding of private sector provision in LMI and transition countries: features of public and private providers are typically compared bivariately, often anecdotally. The privatization program in Macedonia could benefit from a more systematic evaluation of how physicians respond to the incentives of private and public sector practice. Below, the literature on physician productivity and production functions is overviewed with the aim of developed a model of physician output decisions.

Reinhardt (1972) was one of the first to develop a production function for physician services. Physicians are assumed to maximize utility in terms of income and leisure. In the resulting production function, physician output is related to physician hours worked, capital inputs, other labor inputs, and practice characteristics. Reinhardt addresses the problem of output definition noting that, while perhaps ideal, measures of impact on patient health would be quite difficult to operationalize. They remain so. Rather, he uses intermediate outputs such as patient visits and annual billings to patients. An attempt was made to control for types of services provided but the data was not adequate to support this. Using OLS estimation, Reinhardt finds that group practice increases individual output and that non-physician aides also raise productivity, but with decreasing returns.

Since Reinhardt's classic work, production function models of physician output have expanded in application to hospital and office-based contexts. An important evolution has been the greater efforts to separate the effects of different incentives facing physicians from other factors. This is evidenced by the introduction of a richer set of patient and physician characteristics that influence productivity and resource use (Hellinger, 1996; Burns, 1994). The concurrent recognition that patient case mix may have a large effect on productivity has led to inclusion of measures of severity of illness, patient health status, and socioeconomic background (Burns, 1994; Horn et al., 1985). In hospital settings (e.g., Jensen and Morissey, 1986), a common technique is to use a case-mix index to adjust patient admissions across hospitals. In studies that have looked at outpatient productivity, where individual patient-

level data are available, demographic controls are used such as age, gender, and insurance status and type and controls for physicians characteristics (Camasso and Camasso, 1994). However, case mix adjustments are less frequent.

Physician characteristics have also been shown to explain variations of resource use and output in both inpatient and outpatient care (Burns, 1994; Escarce, 1992; Chassin, 1986). Measures such as experience, practice specialty, graduate education, and board certification are commonly used to capture individual characteristics influencing productivity (Burns et al., 1994; Feinglass, 1991; Gaynor and Pauly, 1990). Controlling for these variables has led to a deeper understanding of physician productivity in hospitals and office-based practices. For instance, less experienced physicians have been found to order more tests and provide more intensive care (Eisenberg and Nicklin, 1981; Burns et al., 1994, Roos et al., 1986).<sup>2</sup> Specialists have also been found to provide more intensive care, explained possibly by training that emphasizes a greater use of services (Eisenberg, et al., 1983; Manu and Schwartz, 1983; Fishbane and Starfield, 1981)

### **In-patient Settings.**

Jensen and Morissey (1986) examine the effect physicians have on productivity and use of resources in teaching versus non-teaching hospitals. Output is measured both as raw annual admissions and also admissions adjusted by a Medicare case-mix index. This index is the proportionally weighted sum of admissions across diagnostic classifications and controls for output variations due to patient case-mix. The authors use OLS to estimate a translog production function relating admissions to staff size measures, hospital beds, market characteristics, and hospital teaching status. They find that the marginal productivity (admissions/doctor) is higher in non-teaching hospitals vs. teaching hospitals, due to the less complicated case-mix in non-teaching hospitals. Nursing staff is also found to have a strong positive impact on hospital admissions for non-surgeons but with decreasing returns.

Burns et al., (1994) examine hospital resource use for patients in separate Diagnosis Related Groups (DRGs) to control for case mix variation. They examined discharge data on women

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<sup>2</sup> "Intensive" in this sense, and as used in the remainder of this dissertation, refers to a greater use of equipment, supplies, lab tests, or procedures per patient and should not be confused with care provided in hospital Intensive Care Units.

undergoing cesarean sections and uncomplicated vaginal deliveries and the links to physician characteristics. Relative inefficiency was measured, defined as variation in two alternate dependent variables (patient charges and lengths-of stay) above the average value controlling for case severity, discharge status, and treating hospital. Physician characteristics, including experience and specialty training, are found to have significant influence on resource use. The researchers found evidence to support their hypothesis that efficiency is determined in part by patient load and physician payment scheme: physicians with larger patient loads and greater proportion of managed care patients use fewer resources.

### **Out-patient Settings.**

More relevant to the present study, similar studies have also been conducted in outpatient practices. Gaynor and Pauly (1990) examine relative efficiency of production in group practices as group size and incentive structures vary. They modify the traditional model to include an "effort incentive" variable, developing a behavioral model of production. Gaynor and Pauly argue that production technology – choices of labor and capital input combinations – are set by the firm and thus exogenous to physician decisions. The remaining element of decision autonomy is reduced to choosing a level of effort, which is conditioned on the incentive variable, that includes information on aide wages and a scale reflecting how closely compensation is tied to productivity. Physician and practice characteristics included are: practice specialty, experience, non-physician labor inputs, and whether the practice is a multispecialty group. Capital input is measured by the number of examination rooms. Results are comparable across estimation techniques (two-stage least squares and maximum likelihood frontier estimation) and suggest that efficiency gains are made by a "neutral" application of effort that shift the production function, not by changing its shape. The authors also find that output increases as compensation tied to productivity increases. However efficiency, as measured, does not increase. Individual productivity declines with group size and a greater level of experience is associated with higher output.

Defelice and Bradford (1997) revisit the relative productivity of group and solo practices. They begin by probing whether the two practice types can be compared and pooled in their analysis. Along several dimensions of practice patterns and patient mix, including proportion of patients with different insurance types and proportion of visits requiring different types of

services, solo and group practices are similar. Exceptions are where group practices might be expected to score higher including use of lab and x-ray services and referrals to hospital. They further test whether the groups can be pooled in the multivariate analysis and are unable to reject the null hypothesis that the groups may be pooled. Physician output, in visits per week, is modeled using frontier estimation as a function of physician characteristics (experience, board certification, income external to practice), practice features (mutispecialty group) and market characteristics (number of area hospitals, HMOs, physician to population ratio). In contrast to Reinhardt (1972) they find that there is no significant difference in productivity between solo and group practices.

### Summary

These studies share some common elements. First, comparisons between group types (teaching vs. non-teaching hospitals or group vs. solo practice), are based on interpretation of a single dummy variable. That is, the underlying assumption is that the differences between practice types is due to a shift in efficiency of how fixed input combinations are used, not in how input combinations and resource allocation may vary. Second, all use cross-sectional data, sometimes combining data over a two year period (Jensen and Morissey, 1986; Reinhardt, 1972). This puts a premium on choice of physician and case-mix variables to reduce unobserved heterogeneity. Physician production studies also typically suffer from common problems of variable definition and availability. In hospital contexts, input measures are often omitted or not measured well, especially nursing labor and capital inputs (Newhouse, 1997). More detailed input measures are typically available in outpatient settings. Output, however, is also difficult to define, and available case-mix indices may not be adequate (Newhouse, 1997).

Finally, all studies address the problem of endogeneity of inputs and output and appeal to a variety of devices to deal with it. Reinhardt (1972) attempted two-stage least squares estimation, but concluded that available instrumental variable were poor. Gaynor and Pauly (1990) argue that key inputs (such as physician work hours and capital input) are set at the firm level, therefore outside physician control and exogenous to their output decisions. Defelice and Bradford (1997) instrument for inputs and are unable to reject that inputs are exogenous and proceed with single equation frontier estimation. These authors refer to prior

work which shows that while input and output are endogenous, the simultaneous equation bias introduced is nevertheless negligible (e.g., Griliches, 1963; Feldstein, 1968; Reinhardt, 1975). Hoch (1958) proved that, in a Cobb Douglas form, the bias will be small if producers face variations in input prices and differ in choices of input combinations.

## **6. Physician Production of Patient Care – Methods and Data**

The analytic goal of this dissertation is to examine the performance of physicians under the existing private/public system, specifically the effect of payment incentives on physicians' decisions in treating patients. Many observers of CEE health systems (and transition/LMI countries in general) cite an underutilization of physicians (Healy and McKee, 1997; Borrisov and Rathwell, 1997; Frenk, 1993). More generally, other research has identified problems with efficiency and quality of care in both public and private sector provision in transition economies (e.g., Berman, 1997; WDR 1996; WDR 1993; Bennet, 1994). Perhaps of greatest relevance, improving physician utilization and raising the efficiency and quality of care are key aims of the marketizing reform program.

This chapter describes a model whose output will inform the design of physician incentive and payment systems. It identifies factors influencing physician productivity and resource utilization under the existing private/public system. Prior to that discussion however, I first consider the extent to which analysis of physician behavior under the current system can apply to the proposed capitation payment system.

### **DRAWING LESSONS FOR PAYMENT MECHANISM REFORMS**

Physician behavior is determined by norms of medical practice, payment mechanisms, other incentives established by government regulations, and constraints of the health sector as well as individual physician characteristics. Previous chapters discussed the market and regulatory incentives in some detail. Considering payment systems, there are differences between various methods that, in many contexts, would have implications for lessons drawn from the present analysis for the proposed reforms.

Currently, private sector physicians are paid on a fee-for-service basis and physicians in public clinics are paid a salary. Under the reform program, all PHC public and private physicians will be paid under a capitation system. While incentives to over- or under-provide services in these systems may differ significantly in theory, reviewed empirical studies suggested that physician responses differ within types of payment system and that these responses depend substantially on organizational structures. Organizational structures

which influence physician behavior include micro-level organizational models such as group vs. solo practice, and also larger scale structures of private vs. public ownership and organization of the national health insurance system.

Conrad et al. (1998) examine a cross section of group-based primary care physicians in the US receiving either salary, capitation, production-based (patient visits), or other incentive-based compensation. They found that payment system had no effect on the number of primary care visits or on hospital days per patient. In a more rigorously controlled study, Stearns et al. (1992) evaluated the effect of a change from FFS to capitation payment in a panel study of a U.S.-based medical group treating the same patients under the same benefits package. Physicians responded to the change to capitation by reducing hospitalizations and increasing the number of patient visits. Most of this increase was from within-group referrals; total referral rates increased by 20%. Krasnik et al. (1990) examined responses to a situation opposite to that of Stearns et al. (1992); a change from capitation to a mix of capitation and FFS.<sup>1</sup> This study was of a Copenhagen-based experiment with GPs contracting with the national insurance system. Combining FFS payment with capitation resulted in a 25% decrease in referrals to secondary and in-patient care and, contrary to the findings of Conrad et al. (1998), an increase in PHC visits.

Other research has looked at the effects of both direct compensation and other incentives such as risk-sharing schemes and organizational incentives. Hillman et al. (1989), in a study of US-based health maintenance organizations (HMOs), evaluated responses to salary, capitation, and FFS payment systems. They found no significant difference in the number of visits due to effects of basic payment mechanism alone. However, other risk-sharing incentives did have important effects. Risk-sharing, such as individual risk for deficits in the group hospital fund, were associated with a decrease in outpatient visits. Individual responsibility for outpatient laboratory testing results in a small rise in visits suggesting that physicians may have been substituting visits for testing. Flood et al. (1998) similarly find no significant difference in utilization or cost between simple capitation or FFS payment in a US-based HMO. However, they found that organizational strategies – use of “gatekeepers,” greater convenience and availability of PHC physicians versus specialists, and explicit

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<sup>1</sup> The FFS component covered limited numbers of curative and laboratory services and some preventive care.

practice comparisons and formal commendations – were associated with increased use of PHC relative to specialists and also a reduction in outpatient tests and laboratory use.

Available research has examined physician responses to different payment systems within the same institutional arrangement: capitation vs. FFS in group practices (Stearns et al., 1992), for example, or capitation vs. a mixed system in a national insurance model (Krasnik et al., 1990). In contrast, the reforms in Macedonia envision a fundamental shift in the institutional relationship between existing public physicians and the HIF in addition to a shift to a new payment scheme. Physicians currently in private practice will merely experience a change in reimbursement method; their status as private actors and contractors to the HIF will remain unchanged. Thus, in drawing lessons for the proposed reforms, the salient issue is the provider's financial risks and rewards under the ostensibly unified capitated system: Do both groups of physicians receive comparable incomes for comparable workloads? Do both groups bear equal financial burden or reward for treatments chosen for patient care? Do both groups bear comparable financial risk for their use of resources such as test ordering, referrals, and nursing staff? That physicians currently in public practice will, under the reforms, face similar financial and organizational incentives as private physicians now face ensures the relevance of the analysis described in the following chapters.

## **MODEL OF PHYSICIAN PRODUCTION OF PATIENT CARE**

Building on the physician production function literature reviewed in Chapter 5, I model physician production as a jointly determined process of workload and input utilization. Such a formulation acknowledges the endogeneity of input and output and, more important, allows the straightforward estimation of the demand equations for three key inputs: physician time, capital equipment, and consumable materials. The model is developed in more detail below.

In the first step, output level is conditioned on individual physician, aggregate patient, department, and market characteristics. The effort incentive is captured by a variable identifying public/private practice. Scale and scope effects are measured by the number of nurses per physician in the physician's department and the number of specialty departments in the physician's clinic. Control variables include the standard measures of physician characteristics, patient case-mix and market characteristics. Physician characteristics are age,

gender, specialty, and graduate training. A significant innovation in this work is the inclusion of a physician skill measure in the individual characteristics. Derived from scores on written case simulations, or vignettes, this skill variable provides information on the process quality of care (Peabody et al., 2000). Market characteristics are more limited and are controlled for by dummy variables for city. Finally, the best available patient case control is the percent of care provided that is acute care. The practice specialty variables also control to a large extent patient age-mix: pediatricians see young children; gynecologists see women age 15-45. The structural model is shown below:

Workload:

$$Q = f(D, \Phi, N_n, N_d, Z1, Z2) \quad (1)$$

Input utilization equations:

$$\text{Time} = f(Q_{\text{hat}}, D, \Phi, N_n, N_d, Z1) \quad (2)$$

$$\text{Capital Equipment} = f(Q_{\text{hat}}, D, \Phi, N_n, N_d, Z1) \quad (3)$$

$$\text{Consumables} = f(Q_{\text{hat}}, D, \Phi, N_n, N_d, Z1) \quad (4)$$

where:  $Q$  = Output in patient visits/week

$Q_{\text{hat}}$  = Predicted output in patient visits/week, from equation (1)

$D$  = Public/Private dummy variable

$\Phi$  = Vector of physician characteristics

$N_n$  = Number of nurses/physician in department (scale measure)

$N_d$  = Number of departments in clinic(scope measure)

$Z1$  = Aggregate patient mix controls

$Z2$  = Market characteristics dummies

Time = physician time spent with patient

Equipment = department/clinic fixed equipment inputs

Consumables = department/clinic consumable material inputs

The public/private variable captures the effort incentive that I argue is dominated by the payment systems of these two sectors. Other potential effort effects, such as the influence of human capital in the department or physician training, are controlled for by the department level measures and the vector of physician and practice pattern characteristics yielding the public/private variable a valid measure of the effect of sectoral financial incentives. Finally, self-selection of "better" physicians into private practice, if it occurs, is captured by the physician skill measure.

Pooling of private and public physicians is an important empirical issue in this study. Like prior studies, Equations 2, 3, and 4 assume that the difference in effort incentives simply induces a shift in the production function. That is, production of patient care by public and private physicians is similar with the exception that physicians in one sector may be more efficient. However, the qualitative analysis presented in previous chapters casts doubt on this assumption; it may be that physician workloads and input utilization in the two sectors are determined in very different ways. Reflecting this, I estimate an unrestricted model (also discussed in Chapter 5) that permits a shift in intercept and also a difference in coefficient estimates between the two sectors.

Considering equation 2, the underlying assumption is that the amount of time physicians devote to any one patient is a function of the care required by that patient, conditioned by other physician and department characteristics. In many production contexts (manual assembly, e.g.) the amount of time required to produce a unit of output and the total output over a period of time are highly correlated. This may also be true in a high-volume, managed care context. Physicians in Macedonia, however, are underutilized overall; the average workload is 16 patients per 8 hour day, suggesting that workloads are not time-constrained. Additionally, the relationship between the measures of time per patient inputs and physician workload is not statistically significant, limiting physician choice and variations in this measure further supporting the assumption.<sup>2</sup>

## VARIABLES

Physician workload,  $Q$ , is measured by the number of patients seen by each physician per week. This is derived from the patient log book that each physician is legally required to maintain continuously and regularly audited by the MoH and HIF. This variable is treated as log-normal. The remaining variables are based on physician self-reports and responses to the clinical vignettes.

Physician time spent with patients, *Time*, is captured by two physician responses. The first is the average amount of time spent with patients that present with a new condition (a first

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<sup>2</sup> F-values for the oneway ANOVA on time/patient and patient visits/week: Private = 1.28 (n = 73); Public = 0.80 (n = 37).

visit). The second measure is the average amount of time spent with patients that present with a condition for which they had been seen before (a follow-up visit).

Capital equipment, *Capital*, is represented by measures on the availability of two types of medical equipment, basic medical equipment and more advanced diagnostic equipment. Individual items in these scores are listed in Table 6.1.

**Table 6.1 – List of Capital Equipment**

Equipment Category	List of Items
Basic	Stethoscope; Blood pressure cuff; Otoscope; Thermometer; Speculum; Sterilizer; Weight and Height scales; Resuscitator.
Diagnostic	EKG; Ultrasound; X-ray.

For each of these categories a total score is created, a summative battery based on the number of individual items (Peabody et al., 1998). These battery scores range from 0-1, with a score of 1.0 corresponding to availability of all items on the list; 0.5 corresponds to 50% of items on the list. For basic equipment this variable is constructed to measure the existence of at least one item per doctor. For the expensive diagnostic equipment the score is based on the availability of at least one item per department; the diagnostic score does not rise if a physician has more than one ultrasound, for example. These structural quality measures are collinear. Thus, the input utilization equation (3) is estimated in two specifications with the two different equipment battery scores entering separately. This use of two specifications isolates the effect on utilization of different resource measures.

Similarly, *Consumables*, is captured by collinear measures of consumable department resources. These categories are described in Table 6.2.

**Table 6.2 – List of Consumable Resources**

Consumables Category	List of Items
Medications	<i>Antibiotics</i> : Penicillin; Ampicillin or Amoxicillin; Tetracycline or Erythromycin; Chloramphenicol; Cotrimoxazole; Metronidazole; Aminoglycosides; Cephalosporins; Quinolones
	<i>Anti-Diarrheal</i> : Oral rehydration salts or solution
	<i>Diabetes</i> : Oral hypoglycemic agents; Insulin
	<i>Antipyretic</i> : Paracetamol (acetaminophen); Injectable Lidocaine; Codeine/Narcotics
	<i>Heart Medications</i> : Diuretics; Digitalis preparation; Codeine/Narcotics; Beta Blockers; Ca Channel Blockers; ACE Inhibitors
Supplies	<i>Family Planning Supplies</i> : Oral Contraceptives; Injectable Contraceptives; IUCD; Condoms
	Antiseptics; Bandages; IV fluid, tubing, and needle; Rubber gloves, Protein-in-urine test strips; Glucose-in-urine test strips; Test for Occult blood in stool/fluids.

The output model is estimated in three specifications with different measures of consumable resources. First is a score based on the availability of 9 antibiotic medications. Second, is a battery score measuring availability of all 26 medications in the list. These two scores are separately identified since medications are only those administered in the clinics, not prescribed, and the class of antibiotics may be more generalizable across sectors and clinics. Lastly, is a battery score of basic medical supplies.

Physician identifiers include a dummy variable for private/public practice,  $D$ , and other individual-level attributes,  $\Phi$ . These include the log of years of experience as a physician, categorical variables for medical specialty practiced, and a dummy variable for post-graduate medical training, all of which may have differential effects on workload and resource utilization. In addition overall referral rate, an important feature of individual physician's practice patterns, is included. There is strong evidence that a component of individual physicians' referral rate is due to a characteristic "referral threshold," a referral rate that differs from others after controlling for physician demographics, clinic-level variables (clinic physician and nursing staff) and patient case-mix (Earwicker and Whynes, 1998; Wilkin and

Smith, 1987; Fleming et al., 1991). This measure also helps control for some of the average case-mix severity.

The scale variable,  $Nn$ , is measured by the number of nurses per doctor in individual physicians' departments. This captures the effect of additional human resources in a department have on physician workloads, recalling that nurses in Macedonia do not take an active role in treating patients. Some departments in larger public clinics have a large number of nurses per physician, and this variable is treated as a log normal. Since some departments have one nurse per physician, a zero-skew log transform is used so as not to drop these units.<sup>3</sup> The scope variable,  $Nd$ , is measured by the number of departments in a particular clinic. Both  $Nn$  and  $Nd$  enter the model specifications as splined variables, which allow the coefficient estimates to change at specific points, or "knots." The scale variable,  $Nn$ , has a knot at 2 nurses per physician; no private clinic reports more than this value. Similarly,  $Nd$ , has a knot at three departments per clinic. The key advantage of using splined variables with knots at these points is that they further differentiate between public and private practice settings on these measures.

Individual patient information is unobserved in this study. Aggregate measures of patient health status,  $Z1$ , however are available and include the percent of physicians' patient who present with acute medical conditions and the composition of physician patient panel by age group. Other measures of aggregate health status are controlled by physician specialty, such as specific conditions afflicting the patient population. Differential health status across sectors is not significant due to fact that private and public providers see similar types of patients and provide similar services (the first section in the results chapter provides more detail on this issue). Other patient-level information is captured in the error term.

Market attributes,  $Z2$ , which may differentially affect demand across the study municipalities includes per capita income, urbanicity, percent uninsured, and the number of physicians per capita. However, such measures vary little across the 4 study sites and, furthermore, inclusion of any one will uniquely identify the municipalities. Thus dummy variables for

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<sup>3</sup> The zero-skew log transform takes the form  $y = \ln(\pm x - k)$ , with the sign and  $k$  such that the skewness of  $y$  is zero.

each of the study sites are included. Table 6.3 lists the variables used in estimating equations 1-4. Variable forms were chosen to best fit the assumptions of the OLS model.

**Table 6.3 – List of Model Variables**

Variable	Description	Type
Q	Number of patient visits/week	Continuous, log
Time	Physician time spent per patient	Continuous, log
Equipment	Department equipment inputs	Battery score
Consumables	Department consumable inputs	Battery score
D	Public/Private dummy variable	Dummy
N <sub>n</sub>	Number of nurses/physician in department	Continuous, spline
N <sub>d</sub>	Number of departments in clinic	Continuous, spline
Φ	Physician characteristics:	
	Years of experience	Continuous, log
	Post-graduate medical training	Dummy
	Specialty practiced	Categorical dummy
	Referral rate	Continuous, log
	Skill measure	Continuous, log
Z2	Aggregate patient characteristics	
	Percent practice that is acute care	Continuous
Z1	Market characteristics	
	City	Categorical dummy

Quantitative evaluations of public and private primary care providers are based on primary data collected in a survey of physicians conducted in Macedonian outpatient medical facilities during October and November 1997 (Facility Survey). This survey is part of the larger Capitation Evaluation Program (CEP) conducted by RAND as part of technical assistance provided to the Macedonian Ministry of Health under a World Bank contract and Government of Macedonia loan (Nordyke and Peabody, 1998).

## DATA SOURCES

The Facility Survey and Clinical Vignettes provide comprehensive information on primary care providers, their practice patterns, and the clinics in which they practice. This section describes both data collection efforts in more detail.

## Facility Survey

Survey Design The organization of private and public practices differ significantly and these differences are reflected in the design of the Facility Survey and the terminology used here. Most public physicians practice in multi-specialty clinics that contain 2-6 different departments; each department may employ several physicians.<sup>4</sup> Private physicians typically practice solo or in small, single-specialty clinics. To maintain consistency, the term department is used here to denote both single-specialty units in larger multi-specialty public clinics and also the smaller single-specialty private clinics.

The Facility Survey collects data at both physician and department level. At the individual physician level, it measures physician demographic information, specialty, experience, training, and practice patterns including number of patient seen, referral rates, and use of material resources. At the department level, the Facility Survey collects data on structural measures such as staffing levels, fees charged to patients and availability of equipment, medications and supplies.

The Facility Survey was developed early in 1997. The first draft of the facility instrument was translated and back-translated in April and May 1997. Pre-testing of the Facility Survey in the Macedonian language began in clinics in the capital, Skopje (and hence by facilities that were not part of the study) in May 1997, and continued in outlying municipalities in June and July 1997. In total, over 30 doctors completed the Facility Survey in the pre-test phase. Based on the pre-test, several questions were reworded—primarily due to translations of medical terms.

Sample Frame and Response Rates The Facility Survey is a census of all primary care doctors, both public and private, in the study municipalities. In the four CEP study municipalities, 274 physicians were eligible and 273 participated. The organization of these doctors varied significantly between study sites. This is reflected in Table 6.4 which lists the numbers of PHC physicians and departments within clinics in the survey. In Shtip, for example, there were 38 doctors in the urban Polyclinic and a total of 39 public doctors in the municipality. In contrast, the Health Center in Prilep housed 52 doctors with a total of 77

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<sup>4</sup> Rural clinics and those operated by enterprises and other agencies are typically small, single-specialty clinics.

doctors in public practice in Prilep. The departmental structure varied significantly between study sites. Rather than sampling doctors based on practice or department parameters, the Facility Survey is designed as a census of primary care doctors in the survey municipalities. In the four municipalities studied, a total of 273 of 274 eligible PHC physicians were surveyed.

**Table 6.4 – Facility Survey Sample.**  
(# of Physicians / # of Departments)

Municipality	Public Health Centers and Polyclinics	Private Clinics	Public Rural Clinics	Other Public Urban Clinics
<i>CEP Intervention Sites</i>				
Ohrid	43 / 12	16 / 14	5 / 11	8 / 8
Prilep	52 / 10	8 / 7	11 / 10	14 / 5
<i>CEP Control Sites</i>				
Shtip	38 / 10	6 / 5	3 / 12	1 / 1
Veles	37 / 13	19 / 16	11 / 13	7 / 7

Note: The numbers of physicians sum to 279 due to double-counting of some Health Center physicians who also work in Rural Clinics on a part-time basis.

The needs for, and structure of, primary care varies by site. This is reflected in Table 6.4 which lists the number of physicians by clinic type in the study municipalities. Health Centers (called Polyclinics in some municipalities) are large multi-department clinics providing primary and secondary care urban areas; there is one in each municipality. Private clinics are largely in urban areas or in villages in close proximity to larger cities. Physicians in public Health Centers and private clinics provide most primary care in Macedonia and are the focus of the quantitative analysis. Rural clinics are publicly operated clinics staffed part-time by GPs. While these clinics provide primary care for villagers, the structural quality and care provided in rural clinics is such that they are not included in the analysis. The category “Other Public Clinics” includes labor medicine clinics in factories, clinics for pensioners, and facilities for military personnel.

The census sample frame was developed by drawing on several sources of data on physicians. The medical centers in each of the municipalities supplied their current employment registries, showing the names and locations of all public doctors practicing in their municipalities. This was checked against the registry that the International Project Unit

maintains in Skopje to develop the master list for public doctors. The Ministry of Health and the Chamber of Physicians each provided registries of doctors licensed to practice privately across Macedonia. These two datasets were merged to build the Master List for private doctors in the study sites.

Field Operations and Quality Control Survey researchers used the Master List to arrange office visits with all public and private doctors. Over 95 percent of interviews were completed during the initial appointments. The remaining interviews that were interrupted were completed within 2 days of the original appointment. Following each interview, the interviewer reviewed and edited the questionnaire. As the questionnaires were completed, the forms were delivered to an Assistant Research Supervisor for a second level of editing. Any errors were promptly returned to the field for correction or re-interview if required. Prior to data entry, the Research Supervisor again edited 20 percent of all facility questionnaires, returning questionnaires to the field for correction or re-interview as required.

### **Clinical Vignettes**

Survey Design Clinical vignettes were also administered to evaluate physician competence or skill level. Clinical vignettes are an effective method for evaluating physician skill and have been shown to be superior to chart abstraction and comparable to standardized patient methods of gauging physician competence (Peabody, 1999b). The vignette, or written case simulation, presents a physician-respondent scenario of a patient who has one of the important outpatient clinical conditions seen by doctors in Macedonia. The evaluation measures consist of questions about how the doctor would conduct the consultation—taking a history, physical examination, ordering tests, diagnoses, and treatment plans. Vignettes have been developed and validated for nine common health conditions that are best treated in primary care: coronary artery disease, hypertension, chronic obstructive pulmonary disease, diabetes, prenatal care, tuberculosis, contraception, and low back pain for adult patients, and diarrhea and cough with fever for children. All physicians participating in the Facility Survey were in the Vignette sample.

The Clinical Vignettes were originally developed in the West Los Angeles Veterans Affairs hospital (Peabody et al., 2000). These were translated into Macedonian language, and back-

translated in May 1997. Pre-testing of the Clinical Vignettes in the Macedonian language began in clinics in the capital, Skopje, in June and July 1997. The vignettes were not administered in any sites outside the capital to reduce the possibility of contamination of the sample. In total, over 40 doctors completed Clinical Vignettes in the pre-test phase. Based on the pre-test, several scenarios and questions were reworded due to awkward translations of medical terms.

Sample Frame Following the Facility Survey, Clinical Vignettes were administered to all primary care doctors in the study municipalities; the response rate was 90%. In each municipality, a group administration session was arranged with the director of the local health center. Doctors were invited to attend either a morning or afternoon session depending on their shift in the clinics. As expected, attendance by public doctors was quite good. In all sites, additional visits were required to allow private doctors to complete the vignettes. In two of the sites, Ohrid and Prilep, two separate days were required to allow all public doctors to also participate in the vignettes. Overall, the response rate on the vignettes was over 90 percent.

Field Operations and Quality Control Vignettes were administered and completed in Macedonian. Macedonian MDs, trained in research methods and experienced with the vignettes, translated individual doctors' answers to the vignettes. To ensure uniformity of translations, the four translators translated the same 4 vignettes in an effort to standardize terms. Additionally, each of the subsequent individual translations was reviewed by a colleague for quality control and consistency. When translations were complete, they were shipped to the U.S. for scoring by a single medically trained record abstractor and data entry. Uncertainty over clinical diagnostics or therapeutic terminology (in an estimated 5 percent of responses) was resolved by a team of Macedonian and U.S. physicians.

## 7. Physician Production of Patient Care – Model Results

This chapter presents results of the analysis of physician production of patient care. It opens with an assessment of the comparability of public and private sector physicians. This is essential in establishing that patients “produced” by the two sectors are analogous. Next, I review issues related to estimating the production model, including pooling physicians and clustering in the sample. Results and discussion are presented in subsequent sections.

### REVISITING LIMITATIONS OF THE DATA

From a developing country perspective, the data used in this study permit a very detailed examination of the organization of PHC – extensive data on individual providers is not the norm in this field. Despite this, the data are quite limited from a health services research standpoint, a field accustomed to large, high quality datasets from rich countries which support sophisticated econometric studies. In such a situation, there can be a tendency to push the data too far, to use highly sophisticated methods on inadequate data. The results presented here *do* provide important insights to the performance of private PHC provision in Macedonia. To avoid straining interpretations however, it is useful to reiterate the limitations of this study.

Self-selection of physicians into private practice may be a problem if better physicians are more likely to chose to start a private practice. The qualitative assessment of the private sector does not support this though. A substantial number of physicians with little experience enter the private sector when they can not obtain a paid position in a public clinic. Furthermore, physician skill measures show no significant differences between private and public sectors (Table 7.2, below). These issues are adequately controlled for in the model and, regardless, do not affect the relative effects of private and public practices of physician characteristics. A related issue is that this analysis, following the convention in the production function literature, is cross-sectional. This precludes drawing causal inferences, though the following discussion identifies alternative explanations consistent with our knowledge of physician incentives in this study.

Considering the data behind the results discussed below, the strength of the empirical model varies between the two steps and between specifications of the second step equations. The model of physician workload is the most robust; the dependent variable derives from log books maintained by departmental administrators. The main assumption underlying the second step, in which resource use is modeled, deserves more attention. Here, the availability of equipment, or consumable resources, as a function of workload is interpreted as average use per patient.<sup>1</sup> While availability is associated with use for all these items; if the physicians does not have access, he/she will not be able to use an item. This interpretation is strongest for basic equipment where professional standards dictate a basic physical exam for virtually all patients. In this case, availability is closely associated with use and the interpretation may be valid. The association between availability and use is less strong for the other resource items. Diagnostic equipment use is determined more by patient condition rather than just a patient visit. Using availability as a proxy for utilization is weakest for consumable items. Here, alternative explanations and causal chains become stronger. For example, if we find a low “use” of consumable supplies per patient, another plausible explanation is that this is caused by depletion of consumables due to high utilization rather than a physician choice to use less consumable per patient as workload rises. These cautions stated, the discussion of model results continues.

## **COMPARISON OF PATIENTS AND OUTPUT BETWEEN SECTORS**

The standard choice for output measure is patient visits (patient contacts) per week (e.g., Gaynor and Pauly, 1990; Reinhardt, 1972). Its main advantages are that it is readily measurable and allows simple comparisons. There is a question, however, whether the types of patients seen in public and private clinics are indeed comparable. One factor may be where patients live, a proxy for income, education, and health risks. To an extent this is controlled for by comparing only urban-based PHC physicians with private physicians who, in this sample, are exclusively urban-based. Furthermore, the preventive specialties of School and Labor Medicine as well as physicians in rural clinics – all in the public sector – are excluded from the analysis. As a result, the patient pools and catchment areas for all

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<sup>1</sup> For the model of average time allocated to patients, the dependent variable is a rate as originally collected in the survey. But, as we see later this model does not fit the data well likely due to plausible shortcomings in control variables.

remaining urban PHC physicians are broadly the same in each municipality. In addition to these controls on the physician sample, several other measures from the Facility Survey indicate that patient mix and available clinical services are comparable in both public and private PHC clinics. These are listed in Table 7.1.

**Table 7.1 – Patient-mix and services in Public and Private PHC clinics.**

Variable	Public (n=73) $\mu$	Private (n=37) $\mu$
Patients with HIF coverage, %	91.1	93.5
Patient Mix, % by age group (years) <sup>++</sup>		
0 – 14	32.4	29.4
15 – 24	6.8	10.7
26 – 45	15.3	20.4
46 – 64	19.8	23.2
65 and over	24.4	18.2
Services, as % of all Services <sup>++</sup>		
Consultation	15.9	13.1
Exam	41.9	40.9
Treatment/Procedure	44.4	51.3
Other	2.5	0.20

\*  $p < 0.10$

<sup>++</sup> Totals do not sum to 100.0% due to small differences in response rates in some categories.

The insurance status of patients served by both sectors is quite high. From an access-to-care standpoint, it is disturbing to note however, that a survey of households shows that only 61% of all citizens have insurance coverage (Farley et al., 1997). Patient mix by age group is also largely equivalent across sectors. One of the largest absolute differences (though not statistically significant) is in the oldest age group where there may be some preference among the elderly for the public sector. The only statistically significant difference is in the 15-24 age group, the smallest segment of the population served by both sectors. This may be due to the relatively high health status of this group, but it also reflects the fact that this sub-population is served by public school medicine physicians excluded from the sample. Physician services in the two sectors are also similar in terms of the general domains of clinical services provided to patients.

## MODEL VARIABLES

Physician activities and aggregate patient demographics are comparable across the two sectors, based on available data. However, important differences between public and private clinics are evident when we examine physician and clinic characteristics. Table 7.2 lists variables used in the production of patient care model. The covariance matrix for all model variables is contained in Appendix 1.

**Table 7.2 – Model Variables, Means and Standard Deviations.**

Variable	Description	Public (n=73)		Private (n=37)	
		$\mu$	( $\sigma$ )	$\mu$	( $\sigma$ )
Patients	Patient visits per week <sup>a</sup>	98.8	(44.0)	87.2	(37.4)
Dept	No. of Depts. in Clinic <sup>a</sup>	3.88	(1.79)	1.05	(0.037) ***
RN/Doc	Nurses per physician <sup>a</sup>	2.06	(1.85)	0.865	(0.608) ***
YearsExp	Physician years of experience <sup>a</sup>	14.5	(6.76)	12.5	(10.5) ***
PostGrad	Post-graduate training, dummy <sup>b</sup>	0.425		0.514	
Skill	Physician skill measure <sup>a</sup>	0.479	(0.123)	0.487	(0.084)
GP	General Practice, dummy <sup>b</sup>	0.562		0.757	*
PED	Pediatrics, dummy <sup>b</sup>	0.329		0.216	
GYN	Gynecology, dummy <sup>b</sup>	0.110		0.027	
Acute%	Patients with acute condition, %	49.5	(28.3)	58.5	(21.9) *
Referral	Physician referral rate <sup>a</sup>	0.277	(0.282)	0.249	(0.255)
Ohrid	City dummy <sup>b</sup>	0.247		0.270	
Prilep	City dummy <sup>b</sup>	0.329		0.135	**
Veles	City dummy <sup>b</sup>	0.205		0.432	**
Shtip	City dummy <sup>b</sup>	0.219		0.162	

\*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

<sup>a</sup> Statistics shown for absolute value, significance test performed on natural log transform used in model.

<sup>b</sup> Variables are proportions, thus no standard deviations are given.;  $\chi^2$  significance values reported.

Physician workloads are low relative to those found in other studies.<sup>2</sup> Public sector workloads are about 12% higher than those of private physicians, though this difference is not statistically significant for either the absolute value or natural log transform used in the estimated model. This is in contrast to theory and other empirical evidence; Hickson et al., (1987) for example found that FFS resulted in greater number of visits relative to salary. Nearly all private physicians are in solo practices, while the majority of public physicians

<sup>2</sup> Several comparison rates of (non-HMO) PHC physician weekly workloads in patients/week (normalized to the Macedonian average of 40 hour workweek): 138.2 (Gaynor and Pauly (1990); U.S., 1978 data); 109.6 (Defelice and Bradford, 1997; U.S., 1984 and 1985 data); 133.1 (Reinhardt (1972), U.S., 1964 and 1965 data); 140.0 (Krasnik et al. (1990), Denmark, 1987 data).

practice in large Health Centers or Polyclinics with 4 or more departments. All physicians in the sample work in urban clinics.

The level of nursing labor is an important difference between sectors. Public physicians have available far more nurses per physician than their private counterparts. Eight private physicians (22% of sample) have no nurse working in their office while all public departments have at least one nurse.

Public physicians in the sample have, on average, more experience than private physicians.<sup>3</sup> However, recall that Figure 4.2 showed a bimodal distribution of private physician years. A significant number of private physicians are recent medical graduates, and this group is not well represented in the public sector. The difference in the proportion of patients that present with acute conditions (Acute%) is significant at the 10% level. This is due to the disparities between GPs; public GPs report a mean of 37.8 while private GPs report a mean of 53.6.

Neither public nor private physicians are distributed equally across the four study municipalities. Prilep is the largest municipality in the study and has the largest number of public physicians (public physicians per 1000 citizens is about 1.0 in all cities). Prilep also has the fewest private physicians. Veles has a relatively large number of private physicians and is known in Macedonia as a good market for private doctors, largely due to its proximity (1/2 hour drive) to the capital Skopje.

Dependent variables in the second step of the model estimations also show important differences between the sectors. These are listed in Table 7.3.

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<sup>3</sup> This difference is not statistically significant at the 10% level for the untransformed data.

**Table 7.3 – Input Utilization Dependent Variables, Means and Standard Deviations.**

Variable	Description	Public (n=73)		Private (n=37)		Cronbach's alpha
		$\mu$	( $\sigma$ )	$\mu$	( $\sigma$ )	
TimeNew	Time spent on patients with new conditions. (min)	20.3	(7.68)	25.6	(8.66) ***	NA
TimeFollow	Time spent on follow-up visits. (min)	13.7	(4.79)	16.5	(6.52) **	NA
BasicEq	Basic equipment battery score	0.267	(0.137)	0.518	(0.189) ***	.85
DiagEq	Diagnostic equipment battery score	0.196	(0.165)	0.234	(0.247)	.67
Antibiot	Antibiotics battery score	0.269	(0.214)	0.330	(0.195)	.84
MedsAll	Total medications battery score	0.235	(0.205)	0.334	(0.135) ***	.90
Supplies	Consumable supplies battery score	0.320	(0.204)	0.518	(0.182) ***	.84

\*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

Note: means of battery scores based on availability of a list of items for Basic Equipment (BasicEq), Diagnostic Equipment (DiagEq), Antibiotics (Antibiot), All Medications (MedsAll), and Supplies. See Chapter 6.

Table 7.1 showed that services provided (consultation, exams, treatment) are comparable between public and private clinics. This table, however, suggests that how those services are provided may vary substantially. On all input measures, private physician means are higher, though for Diagnostic Equipment and Antibiotics the differences are not statistically significant.

Some of this difference may be an “artifact of transition,” arising from the heritage of the communist-planned system. First, pre-independence chronic underinvestment in health is now exacerbated by public sector budgets with very limited funds for capital improvements in public clinics. Second, at the time of the survey, the average age of private clinics was only 3 years resulting in a large difference in the age of capital with post-World War 2 public clinics. Finally, as discussed in Chapter 4, physical standards are enforced more strictly in private clinics which may encourage private physicians to maintain higher structural quality standards.

## ESTIMATION ISSUES

The Facility Survey was based on a census of PHC physicians and the response rate was over 99%. Thus, there is little concern about sampling errors due to clustering at the department level in this dataset alone. The response rate for the vignettes varied from 85-95% by

municipality, introducing sampling error into the total sample included in the modeling. This is corrected for by OLS estimation using Huber-White robust standard errors.

With several differences in physician and clinic characteristics across sectors (Tables 7.2 and 7.3), there is a question as to whether public and private physicians can be pooled into a single sample for estimation. A Chow test was conducted on two specifications of equation (1) to examine this. The first specification is a restricted model with all physicians pooled. The second is an unrestricted model with interactions on all independent variables, including the intercept, allowing each coefficient in the restricted model to vary for private physicians. The F-statistic for this test is given below:

$$F(k, N_{\text{pub}} + N_{\text{prv}} - 2k) = \frac{(\text{RESS} - \text{UESS})/k}{\text{UESS}/(N_{\text{pub}} + N_{\text{prv}} - 2k)}$$

where:  $k$  = number of parameters  
 $N_{\text{pub}}$  = number of public physicians  
 $N_{\text{prv}}$  = number of private physicians  
 RESS = Error sum of squares for Restricted Model  
 UESS = Error sum of squares for Unrestricted Model

$$F(15, 73+37-30) = 2.11$$

At a 5% significance level the value of the F-distribution,  $F(15,80)$ , is 1.81 and the restricted model is rejected. Results in the following section are based on the unrestricted model.

## RESULTS

The unrestricted model provides a detailed examination of public and private production of patient care; there are 28 RHS variables (the second spline of the department scope variable is dropped for private physicians as is that for the second spline of the nurses/physician variable). However, presenting 28 coefficient estimates is not ideal using the standard format of a single column of RHS coefficient estimates. For brevity and clarity of presentation a modified format is adopted for the following results. Baseline coefficients (not interacted) correspond to estimates for the public physicians; these are listed in the first column. In the next column, the terms interacted with the private practice dummy variable are listed; these represent marginal changes to the baseline coefficients. This format makes comparison of a

given RHS variable between the two sectors straightforward. Within each column the baseline coefficient estimates, standard errors and p-values are specified.

Interpretation of the table can be clarified by an example. Assume that one of the baseline coefficient estimates is statistically significant, has a value of 0.50, and that the corresponding interaction term is not significant. This is to be interpreted as both public and private coefficient estimates have a value of 0.50. Another illustration: assume a statistically significant baseline coefficient of value 0.50 but with the corresponding interaction term significant at a value of  $-1.0$ . This should be interpreted as the equivalent coefficient for private physicians is  $-0.50$  while that for public physicians remains at 0.50. Following this logic, the final column contains the sum of the baseline and interaction coefficient estimates. These values are equivalent to the coefficients resulting from estimating the model using only the private physicians in the sample, and these may be compared directly to the baseline (public physician) coefficient estimates in column 1 of the results tables. Also included in this final column are the significance levels of the private “offset” coefficient estimates, as determined by estimating the model using only the private physicians.

### **Output: Workload Level**

Results of this model indicated that workload levels do not differ significantly between private and public physicians, controlling for other factors. This observation is based on the interacted constant term (0.513,  $p < 0.50$ ) which reflects the shift in workload due to being “private.” Beyond this, however, there are important differences in the factors that influence physician productivity in the two sectors. Results are presented in Table 7.4.

**Table 7.4 – Production Model Results: Workload.**  
Equation (1). Dependent Variable:  $\ln(\text{Patients})$

Parameter	Model Coefficient Estimates					Private “Offsets” <sup>a</sup>		
	Baseline Coefficients			Interaction Terms				
	$\hat{\alpha}$	Std. Err.		$\hat{\alpha}$	Std. Err.			
ln(Dept_123)	0.279	(0.183)		0.802	(0.498)	1.081	**	
ln(Dept_456)	-0.606	(0.480)		-		-		
ln(RN/Doc_12)	1.202	(0.446)	***	-1.130	(0.487)	**	0.072	
ln(RN/Doc_3+)	-1.062	(0.633)	*	-			-	
ln(YearsExp)	-0.261	(0.114)	**	0.302	(0.179)	*	0.041	
PostGrad	0.234	(0.126)	*	-0.704	(0.359)	*	-0.470	
ln(Skill)	-0.497	(0.177)	***	0.127	(0.512)		-0.369	
GP	0.845	(0.276)	***	0.313	(0.542)		1.158	**
PED	0.373	(0.277)		1.141	(0.578)	*	1.515	***
Acute%	-0.002	(0.002)		-0.011	(0.004)	**	-0.013	***
Referral	-0.123	(0.048)	**	-0.240	(0.092)	**	-0.363	***
Ohrid	-0.330	(0.213)		-0.035	(0.316)		-0.365	
Prilep	0.213	(0.150)		-0.912	(0.337)	***	-0.699	**
Veles	-0.010	(0.189)		-0.204	(0.297)		-0.214	
Constant	2.877	(0.417)	***	0.467	(0.695)		3.343	***
n	110							
adj. R <sup>2</sup>	0.5482							

\*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

<sup>a</sup> – significance level of coefficient estimates from run with private physician sample only.

*Department Characteristics* Department level factors exert some influence on workload choice. There may be some possible productivity benefits to multi-department public clinics, however, the department scope variable is not significant at the 10% level (for first segment of the splined variable, Public:  $p < 0.150$ ). The derived coefficient estimate for the private sample is positive and significant, though most private clinics are solo practices. Nursing labor is an important determinant of physician productivity in the public sector. The elasticity on nurses per physician is nearly unity for up to three nurses per physician, and there is an indication of diminishing returns to nurse staffing levels above this level. The interaction coefficient is also statistically significant and of comparable magnitude in the opposite direction. This represents a complete offset of the baseline coefficient such that the corresponding coefficient for private physicians is not different from zero. Recall that nursing levels in the private sector are much lower than in public clinics and a small number of private clinics have no nurses.

*Physician Characteristics* The influence of individual physician factors show marked difference between the two sectors. The effects of experience is one example. In public clinics, younger physicians have higher workloads. This is consistent with the status system in the public sector where seniority is a primary factor. The effect of greater years of experience in the private sector is not significant.

The effects of post-graduate training also diverge between the two sectors. Public sector physicians with post-graduate training have higher workloads. The staffing of public departments is the likely underlying cause of this. General medicine departments employ both general practitioners and graduate specialists in general medicine. Similarly, public pediatric departments employ both trained pediatricians and general practitioners. Higher productivity among specialists in these departments is consistent with this organization. Private physicians with post-graduate training have lower workloads, likely owing to provision of more comprehensive care than other private physicians with less training. It is also possible that private specialists may receive more income from patients seeking discretionary care outside of the HIF insurance system and thus see fewer HIF-reimbursable patients.

The effect of physician skill is to decrease workload and is comparable across sectors; the skill elasticity for public physicians is  $-0.49$ ; it is slightly less strong in private sector. This is consistent with physicians trading quantity for quality where more highly skilled physicians treat fewer patients better. This does not necessarily entail more time per patient (and we see that is not supported below) but that higher physician skill leads to more intensive and demanding care such as better examinations and more detailed consultations.

Workloads vary across practice specialty and, in the three specialty departments, share similar patterns in both sectors. GPs and pediatricians have higher workloads than gynecologists. Private pediatricians, however, have higher workloads than private GPs. This relative difference in workload reflects the fact that private pediatricians are able to see a larger and older population than their public sector counterparts (0-14 vs. 0-6 yrs). The difference in relative workloads between pediatricians and GPs may also reflect demand

factors: parents are willing to go to private clinics for care with shorter waiting times or higher perceived quality (e.g., reduced exposure to other sick children waiting).

*Practice Patterns* Public sector workloads are not significantly influenced by the proportion of patients that present with acute conditions. In private clinics, the acute condition elasticity on workload is  $-1.3$ . This difference may arise if private physicians see relatively more acute cases or if public sector physicians' behavior does not respond to this patient characteristic.

As referral rates increase, the number of patient visits declines in both sectors (recall that referral rate is the rate at which the observed physician refers patients to another physician or to inpatient care). There are several possible interpretations for this. It may reflect an administrative burden on physicians or a more complicated case-mix not captured by available measures. The referral rate elasticity in the private sector is significant and about three times that for public physicians. Some of this difference is due to the incentives of FFS reimbursement, in which physicians have incentive to provide more services to a patient rather than refer them.<sup>4</sup> Much of the remaining difference could be due to the prohibitions on public sector referrals to private physicians and private physicians' hospital privileges discussed in Chapter 4; over time, private physicians with higher referral rates may be "referring away" some of their patient roster.

*Municipalities* Prilep stands out as different from the other municipalities for the private physician sample. The interaction term indicates a negative coefficient for private physicians. Potential causes of this effect are difficult to identify. With the highly aggregated measures of case mix available, case-mix controls are suspect. However, it can also be argued that the political environment influences private physician workload. In the elite interviews, discussed in Chapter 4, participants from Prilep voiced the most complaints about HIF procedures. Prilep respondents suggested that more punitive actions had been taken by the Prilep HIF branch office, and this was supported by the director of the branch office. Lower private sector workloads in Prilep are consistent with the argument that the HIF Branch Office in Prilep has been more aggressive than other branch offices in taking the

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<sup>4</sup> However, Krasnik et al. (1990) show a minimal effect of payment scheme on referral rate.

actions described in Chapter 4, such as contract cancellations, punitive inspections, and retroactive reimbursement disallowal for specific types of formally allowed services.

### Input Utilization: Time Inputs - Time with Patients

The models of physician time spent with patients perform relatively poorly. Only one estimated coefficient is significant in the unrestricted model and the models explain only about 10% of the variation in both input measures. This is most likely due to a lack of adequately disaggregated case-mix measures that capture the factors that determine the amount of time devoted to patients such as case-mix adjustment measures. These data do not contain such measures and the department medical charts from which they might be abstracted record diagnostic codes only sporadically.

Table 7.5 presents results from the 2nd step; input utilization estimations for time with 1) new patients and 2) time with follow-up cases. This is the only instance where the results from two regressions are presented in a single table.

**Table 7.5 – Production Model Results: Input Utilization.**  
Equation 2/Specifications 1 and 2. Dependent Variable: Time Inputs

Parameter	Time with New Patients				Time with Follow-up Cases			
	Baseline Coefficients		Interaction Terms		Baseline Coefficients		Interaction Terms	
	$\hat{\alpha}$	Std. Err.	$\hat{\alpha}$	Std. Err.	$\hat{\alpha}$	Std. Err.	$\hat{\alpha}$	Std. Err.
Qhat	1.85	(6.73)	-6.59	(12.2)	-0.705	(455)	2.78	(7.57)
ln(Dept_123)	5.64	(4.02)	2.88	(9.89)	1.30	(2.72)	1.68	(9.32)
ln(Dept_456)	-15.0	(7.72) *			-3.92	(5.22)		
ln(RN/Doc_12)	-3.68	(12.5)	5.48	(11.2)	-5.81	(8.47)	5.49	(8.78)
ln(RN/Doc_3+)	3.52	(14.9)	1.57	(2.07)	6.69	(10.1)		
ln(YearsExp)	1.15	(2.60)	0.893	(3.85)	0.733	(1.76)	-1.64	(2.51)
PostGrad	0.626	(2.57)	0.387	(9.20)	1.35	(1.74)	5.10	(5.90)
ln(Skill)	4.75	(4.63)	-19.3	(12.3)	0.995	(3.13)	-6.83	(8.19)
GP	-5.55	(8.07)	-1.67	(15.1)	0.198	(5.46)	-1.36	(9.16)
PED	-5.14	(6.43)	-8.51	(14.5)	2.43	(4.35)	-2.39	(9.16)
Acute%	0.009	(0.044)	0.067	(0.134)	-0.020	(0.030)	0.042	(0.090)
Referral	0.136	(1.32)	-3.51	(3.49)	-0.341	(0.891)	-1.51	(2.27)
Constant	17.9	(18.3)	3.51	(37.2)	18.7	(12.4)	-20.8	(23.8)
n	110				110			
adj. R <sup>2</sup>	0.1376				0.1075			

\* p < 0.10.

### Input Utilization: Capital Inputs - Basic Equipment

These results indicate that private clinics are able to apply higher levels of basic equipment to patient care even as patient load increases. Physicians in public clinics, due to a relative lack of resources, may provide less equipment-intensive care as workload rises. Other results, such as the effect of referral rate are largely consistent with the incentives of private practice, as discussed below. Table 7.6 presents results from the input utilization estimations for basic equipment.

**Table 7.6 – Production Model Results: Input Utilization.**  
Equation 3 /Specification 1. Dependent Variable: Basic Equipment

Parameter	Model Coefficient Estimates						Private “Offsets” <sup>a</sup>	
	Baseline Coefficients			Interaction Terms				
	$\hat{\alpha}$	Std. Err.		$\hat{\alpha}$	Std. Err.			
Qhat	-0.352	(0.087)	***	0.877	(0.144)	***	0.525	***
ln(Dept_123)	0.155	(0.052)	***	-0.875	(0.177)	***	-0.720	***
ln(Dept_456)	-0.196	(0.099)	*	-			-	
ln(RN/Doc_12)	0.677	(0.161)	***	-0.606	(0.167)	***	0.071	
ln(RN/Doc_3+)	-0.512	(0.192)	***	-			-	
ln(YearsExp)	-0.123	(0.034)	***	0.043	(0.048)		-0.080	*
PostGrad	0.092	(0.033)	***	0.428	(0.112)	***	0.520	***
ln(Skill)	-0.210	(0.060)	***	1.078	(0.156)	***	0.868	***
GP	0.097	(0.104)		-0.752	(0.174)	***	-0.655	***
PED	0.041	(0.083)		-0.814	(0.174)	***	-0.773	***
Acute%	-0.001	(0.001)		0.010	(0.002)	***	0.010	***
Referral	-0.042	(0.017)	**	0.264	(0.043)	***	0.222	***
Constant	1.20	(0.236)	***	-1.92	(0.453)	***	-0.729	
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	n	110						
	adj. R <sup>2</sup>	0.7394						

\* p < 0.10; \*\* p < 0.05; \*\*\* p < 0.01.

<sup>a</sup> – significance level of coefficient estimates from run with private physician sample only.

*Workload Effects* In this and other input utilization model results, it is useful to interpret the coefficients on the predicted workload (Qhat<sup>5</sup>) and the constant terms jointly. Doing so reveals that at low workload levels (up to 20 patients per week), the levels of basic equipment available on a per patient basis is comparable between sectors. Above this, the level of basic equipment rises quickly with workload in private clinics while it is relatively low in the public sector. This suggests that public and private sector departments with low

<sup>5</sup> Note that this is the predicted value of a natural log.

utilization are comparably equipped. But, as workload rises, the more successful private clinics have available greater levels of basic equipment than higher volume public departments.

Thus, in public clinics, as workload increases lower levels of basic equipment can be applied to patient care. This may reflect a behavior whereby as workload increases, physicians are able to apply less basic equipment in treating patients. Sharing of limited equipment in public departments would cause this. If so, this raises questions of quality of care in higher volume public departments. The negative workload coefficient might also reflect poor allocation of equipment by Health Center management, where more highly utilized departments are provided with fewer resources. Private physicians, on the other hand, are able to use increasing levels of basic equipment at higher workloads. This is consistent with incentives of private practice and FFS payment; physicians attempt to please patients and also increase reimbursement income by providing more equipment-intensive services.

*Department Characteristics* There is greater availability of equipment and hence more equipment-intensive care, holding workload constant, in multi-department public clinics as indicated by the is positive and significant scope variable. There are diminishing returns to number of departments in public clinics.<sup>6</sup> The effect of clinic scope is reversed in the few private clinics which have more than one specialty department; this most likely reflects sharing of equipment in the few private group practices.

Basic equipment levels increase with public sector nursing levels, but this effect diminishes at nursing levels above 3 nurses per physicians. In the private sector, the nursing interaction term offsets the baseline coefficient such that the effect of nurse staff on basic equipment is zero.

*Physician Characteristics* Older public physicians have access to less basic equipment than younger colleagues as indicated by the coefficient on experience for public sector. The coefficient on post-graduate training is positive for both sectors. These results are consistent

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<sup>6</sup> This might reflect either zero or negative returns; recall that the splined variables are "marginal" such that the baseline elasticity on numbers of departments above 4 departments in this case would be  $0.155 - 0.196 = -0.039$ .

with older physicians and those without specialty training providing less equipment-intensive care. Here, the effect in the private sector is much stronger than for public physicians.

Public sector physicians with lower skill measures have available higher levels of basic equipment. Conversely, more highly skilled private physician are able to provide more equipment-intensive care. It is not possible to draw inferences about appropriateness of care provided with the available data. Note that the training of physicians in the two sectors is the same (Table 7.2) yet, controlling for post-graduate training, usage of equipment differs significantly. A plausible explanation is that more highly skilled private physicians are better able to respond to incentives of private practice by providing more equipment-intensive care.

Public sector GPs have slightly higher basic equipment utilization than public pediatricians or gynecologists. This could be due to a more varied case-mix in public general medicine departments that requires use of a more diverse set of equipment. In the private sector, gynecologists (the dropped category) use basic equipment more intensely than their GP and pediatricians colleagues.

*Practice Patterns* Similar to its influence in the workload estimation, the proportion of acute cases has an effect only in the private sector, possibly reflecting private physicians responding to the need for more examinations to treat a new, unknown condition.

Increasing referral rates have different effects on basic equipment, consistent with incentives in the two sectors. Public physicians have lower basic equipment per patient availability as their referral rates rise. This could be caused by referring due to a lack of equipment or by physicians deferring further evaluation in lieu of the referral because it decreases their workload. Basic equipment levels in private clinics increase as referral rates rise. This is consistent with incentives to provide intensive care to more complex cases that in the public sector are referred to specialists. This would have the effect of either providing more continuity or delaying a needed referral. That private equipment levels are associated with higher referral rates may also arise if private physicians react to higher referrals as a signal to acquire more medical equipment to treat their patients.

### Input Utilization: Capital Inputs - Diagnostic Equipment

The input utilization estimate for more sophisticated diagnostic equipment is a poorer fit than for basic equipment. This may be due in part to the construction of the dependent variable; note that the Cronbach's alpha (Table 7.3) for diagnostic equipment is just 0.67. The poor fit for this model may also reflect the lack of adequate patient case mix controls that may influence allocation and use of diagnostic equipment. This is plausible since availability of basic equipment is more related to standard examination practices (for example use of blood pressure cuffs or stethoscopes) whereas demand for diagnostic equipment is determined more by patient conditions. Table 7.7 presents results from the input utilization estimation for diagnostic equipment.

**Table 7.7 – Production Model Results: Input Utilization.**  
Equation 3 /Specification 2. Dependent Variable: Diagnostic Equipment

Parameter	Model Coefficient Estimates					Private "Offsets" <sup>a</sup>	
	Baseline Coefficients		Interaction Terms				
	$\hat{\alpha}$	Std. Err.	$\hat{\alpha}$	Std. Err.		$\hat{\alpha}'$	
Qhat	-0.021	0.149	0.490	0.247	*	0.469	*
ln(Dept_123)	0.037	0.089	-0.903	0.304	***	-0.866	**
ln(Dept_456)	-0.008	0.170	-			-	
ln(RN/Doc_12)	-0.115	0.276	0.194	0.286		0.080	
ln(RN/Doc_3+)	0.171	0.329	-			-	
ln(YearsExp)	0.088	0.057	-0.066	0.082		0.021	
PostGrad	-0.015	0.057	0.313	0.193		0.298	
ln(Skill)	0.258	0.102	**	0.237	0.267	0.495	
GP	-0.020	0.178	-0.146	0.299		-0.166	
PED	-0.092	0.142	-0.532	0.299	*	-0.623	*
Acute%	0.001	0.001	0.006	0.003	**	0.007	*
Referral	-0.041	0.029	0.161	0.074	**	0.121	
Constant	0.231	0.404	-1.79	0.777	**	-1.56	*
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	n	110					
	adj. R <sup>2</sup>	0.2353					

\* p < 0.10; \*\* p < 0.05; \*\*\* p < 0.01.

<sup>a</sup> – significance level of coefficient estimates from run with private physician sample only.

*Workload Effects* The dependence of diagnostic equipment on workload for private practice is similar to that for basic equipment. However, for public physicians the workload coefficient estimate is not significant. Thus at low workloads, the levels of diagnostic equipment available on a per patient basis is comparable in both sectors.

As physician workload increases in public clinics, the level of diagnostic equipment on a per patient basis remains constant. More highly utilized private sector physicians are able to devote a greater level of diagnostic equipment to patient care. This effect is consistent with incentives of private practice and FFS payment – physicians attempt to please patients and also increase reimbursement income by providing more equipment intensive services. Higher volume (more successful) private practices are also able to purchase more capital equipment.

*Department Characteristics* Scope variables are not significant for public physicians. For private physicians, the effect of clinic size is negative, which most likely reflects sharing of equipment.

*Physician Characteristics* The only significant effect noted among physician characteristics is skill level of public physicians. Increasing the skill level of public physicians has the effect of increasing the availability of diagnostic equipment. This may reflect seniority-based access to expensive equipment within the public clinic hierarchy. The correlation between skill and diagnostic equipment levels may reflect self-selection of higher skilled physicians to better-equipped departments. This explanation is consistent with a greater ability to identify potential underlying conditions, ordering appropriate tests, and an ability to interpret and use the results of sophisticated diagnostic tests. The effect of skill is similar for private physicians; the interaction coefficient estimate is not different from zero.

*Practice Patterns* The proportion of acute cases has an effect only in the private sector, possibly reflecting private physicians responding to the need for more examinations to treat a new, unknown condition. It is also consistent with a response to the incentives of FFS payment to provide more intensive care.

The effects of referral rates are similar in magnitude and direction as in basic equipment. However, the effects are not significant in the public sector. Private physicians are able to utilize diagnostic equipment somewhat more as referral rates rise. This is consistent with providing more intensive care to complex cases and also attempting to retain patients who ultimately are referred to secondary care.

### Input Utilization: Consumable Inputs - Antibiotics

Results from all three estimates of consumable input utilization are comparable in terms of direction of effects of different factors, however the significance and magnitude varies from specification to specification. For antibiotics, the explanatory power of the model is moderate relative to those of other consumables. These results are listed in Table 7.8 and discussed in more detail below.

**Table 7.8 – Production Model Results: Input Utilization.**  
Equation 4 /Specification 1. Dependent Variable: Antibiotics

Parameter	Model Coefficient Estimates					Private “Offsets” <sup>a</sup>	
	Baseline Coefficients		Interaction Terms				
	$\hat{\alpha}$	Std. Err.	$\hat{\alpha}$	Std. Err.	$\hat{\alpha}'$		
Qhat	-0.067	0.144	-0.475	0.239	*	-0.542	***
ln(Dept_123)	0.077	0.086	0.530	0.294	*	0.607	**
ln(Dept_456)	-0.288	0.165	-			-	
ln(RN/Doc_12)	0.104	0.268	-0.067	0.278		0.037	
ln(RN/Doc_3+)	0.365	0.319	-			-	
ln(YearsExp)	-0.041	0.056	-0.034	0.079		-0.076	
PostGrad	0.044	0.055	-0.215	0.187		-0.171	
ln(Skill)	-0.023	0.099	-0.461	0.259	*	-0.483	*
GP	0.147	0.172	-0.062	0.289		0.084	
PED	0.077	0.137	0.041	0.289		0.118	
Acute%	0.002	0.001	-0.006	0.003	**	-0.005	*
Referral	-0.021	0.028	-0.154	0.072	**	-0.176	**
Constant	0.289	0.392	2.12	0.753	***	2.41	***
n	110						
adj. R <sup>2</sup>	0.3689						

\* p < 0.10; \*\* p < 0.05; \*\*\* p < 0.01.

<sup>a</sup> – significance level of coefficient estimates from run with private physician sample only.

*Workload Effects* Private clinics show a distinct negative effect of workload on antibiotics. Public physicians do not experience this workload-dependent phenomenon for antibiotics. This may be due to two main effects, neither of which can be separately identified with the existing data. First, it may be that private clinics simply stock fewer antibiotics, relative to their patient loads, than in public clinics. Secondly, a related but distinct mechanism is that private clinics experience a greater degree of depletion of this consumable than public clinics. This could be due to differing ability to restock antibiotics between public and private clinics.

*Department Characteristics* Clinic scope is an important determinant of antibiotic availability in private clinics. Physicians in multi-specialty private clinics have available more antibiotics to administer to their patients. In private clinics, solo practices may have a greater problem with stock-outs than group practices. In contrast, physicians in larger multi-specialty public clinics have less antibiotics available for their patients than physicians in public clinics with a just a few specialty departments.

*Physician Characteristics* Variations in skill level of public physicians do not explain differences in the availability of antibiotics. More highly skilled private physicians, however, have fewer antibiotics than less skilled private colleagues. This may be due to more appropriate use of antibiotics or a greater ability to conserve a depletable resource. It may also reflect a decision by more highly skilled physicians to not stock as many antibiotics than less skilled physicians. Both explanations are consistent with more highly skilled private physicians viewing higher levels of antibiotics as inappropriate or not cost-effective for patient care.

*Practice Patterns* The acute condition coefficient is slightly positive for public physicians; controlling for stockouts, they may administer more antibiotics to patients with acute conditions. The corresponding value for private physicians is larger and opposite in sign, suggesting that this variable is also capturing some of the depletion problem. Furthermore, that private physicians administer antibiotics less as referral rates increase is consistent with a depletion problem in private clinics as more antibiotics are administered to sicker patients.

#### **Input Utilization: Consumable Inputs – All Medications**

The model using the score for all medications available for in-clinic administration exhibits a better fit to the data than that for antibiotics alone. This model also shows that the influence of many explanatory variables is similar across public and private physicians. Of note is the negative relationship between skill and the level of medications for both physician types.

Table 7.9 contains results of this model.

**Table 7.9 – Production Model Results: Input Utilization.**  
Equation 4 /Specification 2. Dependent Variable: Medications

Parameter	Model Coefficient Estimates					
	Baseline Coefficients			Interaction Terms		Private "Offsets" <sup>a</sup>
	$\hat{\alpha}$	Std. Err.		$\hat{\alpha}$	Std. Err.	$\hat{\alpha}'$
Qhat	-0.460	0.108	***	0.173	0.180	-0.287 *
ln(Dept_123)	0.128	0.065	*	0.151	0.222	0.279
ln(Dept_456)	-0.372	0.124	***	-		-
ln(RN/Doc_12)	0.665	0.202	***	-0.617	0.209 ***	0.048
ln(RN/Doc_3+)	-0.307	0.240		-		-
ln(YearsExp)	-0.128	0.042	***	0.076	0.060	-0.052
PostGrad	0.140	0.041	***	-0.144	0.141	-0.004
ln(Skill)	-0.195	0.075	**	-0.059	0.195	-0.254
GP	0.539	0.130	***	-0.373	0.218 *	0.166
PED	0.193	0.103	*	-0.099	0.218	0.095
Acute%	0.001	0.001		-0.002	0.002	-0.002
Referral	-0.063	0.021	***	-0.008	0.054	-0.071
Constant	1.33	0.295	***	-0.022	0.567	1.31 **
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	n	110				
	adj. R <sup>2</sup>	0.5663				

\* p < 0.10; \*\* p < 0.05; \*\*\* p < 0.01.

<sup>a</sup> – significance level of coefficient estimates from run with private physician sample only.

*Workload Effects* Similar to the experience of private physicians with antibiotics, both public and private physicians experience lower availability of medications as workload rises. This effect is somewhat greater in public clinics. Again, the relative effects of 1) a decision to simply stock small amounts of medications regardless of workload and 2) workload-related depletion cannot be separated.

*Department Characteristics* The effect of nursing levels is familiar, in that the elasticity on nurses per physician public clinics is large with an indication of diminishing, likely negative, returns above three nurses per physician. Nursing levels have no statistically significant effect on overall medications in private clinics.

*Physician Characteristics* The pattern of the effects of experience and post-graduate training on medications use in public clinics is similar to those seen in the basic equipment results. Younger public sector physicians, and those with post-graduate training, have available more medications, consistent with these physicians making more intensive use of medications than

their older, or general practitioner, colleagues. These effect of experience among private physicians are comparable to those for public physicians. However, there is no statistically significant effect of post-graduate training in the private sector.

Skill has a small but consistent effect in both sectors. One explanation of this is that more highly skilled physicians make less intensive use of their formulary for in-clinic administration. It may be tempting to point to this as an indication of higher skill being correlated with appropriate use of medications but available data cannot support such inferences.

Pediatricians and GPs in both sectors tend to administer more medications per patient than gynecologists in the same sector. This is likely due to a more diverse case mix in these departments.

*Practice Patterns* The effects of practice patterns are of little practical importance where they are statistically significant. The elasticity on referral rate for public physicians is negative. Though this effect is quite small in magnitude, it could indicate a depletion problem due to administering more medications to sicker patients. However, reflecting the problems interpreting these results, this is also consistent with physicians referring relatively more patients due to a lack of appropriate medications.

#### **Input Utilization: Consumable Inputs – Supplies**

Results of the input utilization model using departmental supplies are similar to those for medications; the influence of many explanatory variables is differs significantly across public and private physicians and some of the differences are striking. Importantly, the relationship between skill and level of supplies is not statistically significant for private physicians. Table 7.10 contains results of this model.

**Table 7.10 – Production Model Results: Input Utilization.**  
Equation 4 /Specification 3. Dependent Variable: Supplies

Parameter	Model Coefficient Estimates						Private “Offsets” <sup>a</sup>
	Baseline Coefficients			Interaction Terms			
	$\hat{a}$	Std. Err.		$\hat{a}$	Std. Err.		
Qhat	-0.591	0.104	***	0.322	0.174	*	-0.269
ln(Dept_123)	0.319	0.062	***	0.094	0.214		0.413
ln(Dept_456)	-0.585	0.120	***	-			-
ln(RN/Doc_12)	0.753	0.194	***	-0.821	0.201	***	-0.068
ln(RN/Doc_3+)	-0.585	0.231	**	-			-
ln(YearsExp)	-0.071	0.040	**	0.102	0.058	*	0.031
PostGrad	0.113	0.040	***	-0.257	0.135	*	-0.143
ln(Skill)	-0.128	0.072	*	0.067	0.188		-0.060
GP	0.664	0.125	***	-0.650	0.210	***	0.014
PED	0.235	0.100	**	-0.111	0.211		0.124
Acute%	0.001	0.001		-0.006	0.002	***	-0.005
Referral	-0.093	0.020	***	0.010	0.052		-0.084
Constant	1.67	0.284	***	0.272	0.546		1.94
n	110						
adj. R <sup>2</sup>	0.6576						

\* p < 0.10; \*\* p < 0.05; \*\*\* p < 0.01.

<sup>a</sup> – significance level of coefficient estimates from run with private physician sample only.

*Workload Effects* One important departure from the models of medication availability, is that the relationship between workload and supplies availability for private physicians is negligible. Two plausible reasons for this are: 1) the effects of fee-for-service payment which reimburses private physicians for medical supplies; and, 2) private physicians raising patient satisfaction with an aspect of care very tangible to patients. Both of these explanations would encourage private physicians to maintain adequate stocks of medical supplies.

*Department Characteristics* Physicians in smaller public clinics have available more supplies than do those in larger multi-specialty clinics. This effect in public clinics is consistent across all consumable input utilization models and strongest for supplies. That is, public physicians in large clinics have available much lower levels of consumables, controlling for workload. This trend may reflect a situation in which supplies and other consumable inputs are allocated to clinics rather than individual departments within the clinic facilities.

The effect of nursing levels on supply levels for public physicians is positive with a strong indication of decreasing returns above three nurses per physician per department. Effects of nursing levels are offset to zero and have no statistically significant effect in private clinics.

*Physician Characteristics* The pattern of experience and post-graduate training effects in public clinics is similar to use of other consumable inputs. Younger physicians and those with post-graduate training have more supplies available than their older colleagues. Both results are consistent with the convention of younger and more highly trained physicians tend to provide more input-intensive care.

Pediatricians and GPs in public practice have available more supplies per patient than public gynecologists. An effect that is reversed in the private sector. This reversal between sectors is likely due to private gynecologists providing more extensive examinations than those provided by public sector gynecologists and therefore stocking a greater level of supplies.

*Practice Patterns* Similar to results of the medications input utilization model, practice pattern variable have little practical or statistical significant effect on supply levels.

## **SIMULATIONS OF "AVERAGE" PHYSICIAN PRODUCTION**

In the context of Macedonian primary health care, an unrestricted model best captures the disparate natures of public and private practice. Interpreting the results of such a model is difficult; the differences between public and private practice are reflected in all the interaction terms on RHS variables rather than the single intercept shift of a restricted model.

To better answer whether there are advantages to private practice, I use the regression results presented in the previous Tables to predict workload and equipment availability for "average" physicians at different ranges of selected RHS variables. This calculation is performed for each of the two sectors as follows:

$$y_{n,i} = \beta_n X_{n,i} + \sum_{m \neq n} \beta_m X_m$$

where:  $y_{n,i}$  =  $i$ th predicted value for a range of  $X_n$

$\beta_n$  = Coefficient estimate for  $X_n$

$X_{n,i}$  = RHS variable, taking on  $i$  values over range of  $X_n$

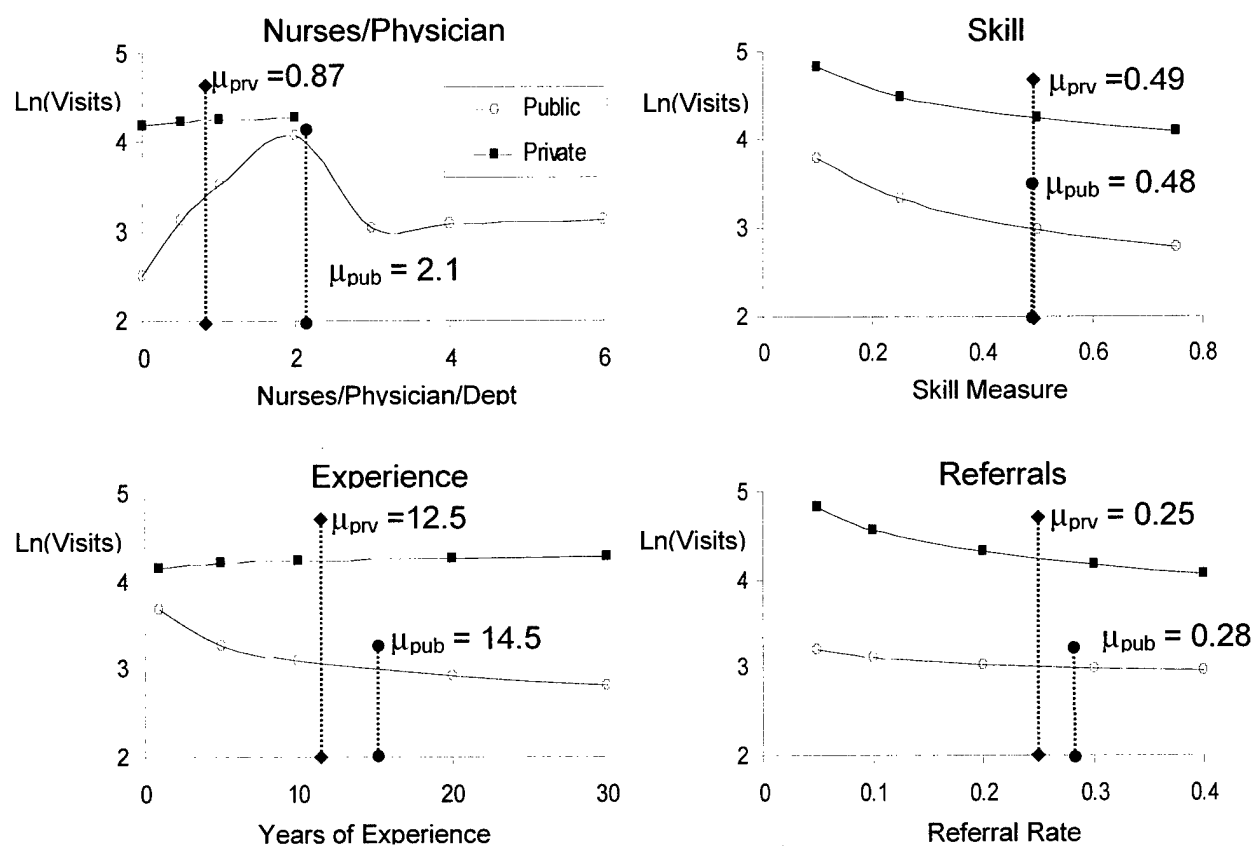
$\beta_m$  = Coefficient estimate for  $X_m$

$X_m$  = mean of RHS variable

For the public sector, the baseline coefficient estimates are used; predicted values for the private sector are calculated using the sum of the baseline and the interaction terms (the derived coefficients). These calculations were conducted for the results of the workload estimation and those of the basic equipment utilization model. The main reasons for this are simplicity and, recalling the discussion at the beginning of this chapter, these two estimates support the strongest interpretations. Results of these simulations are presented and discussed below.

**Workload Simulation** Figure 7.1 depicts four different scenarios of predicted workloads for public and private physicians. Each of the graphs plot predicted workload over a relevant range of a single RHS variable with all other variables held at the respective means for each sector.

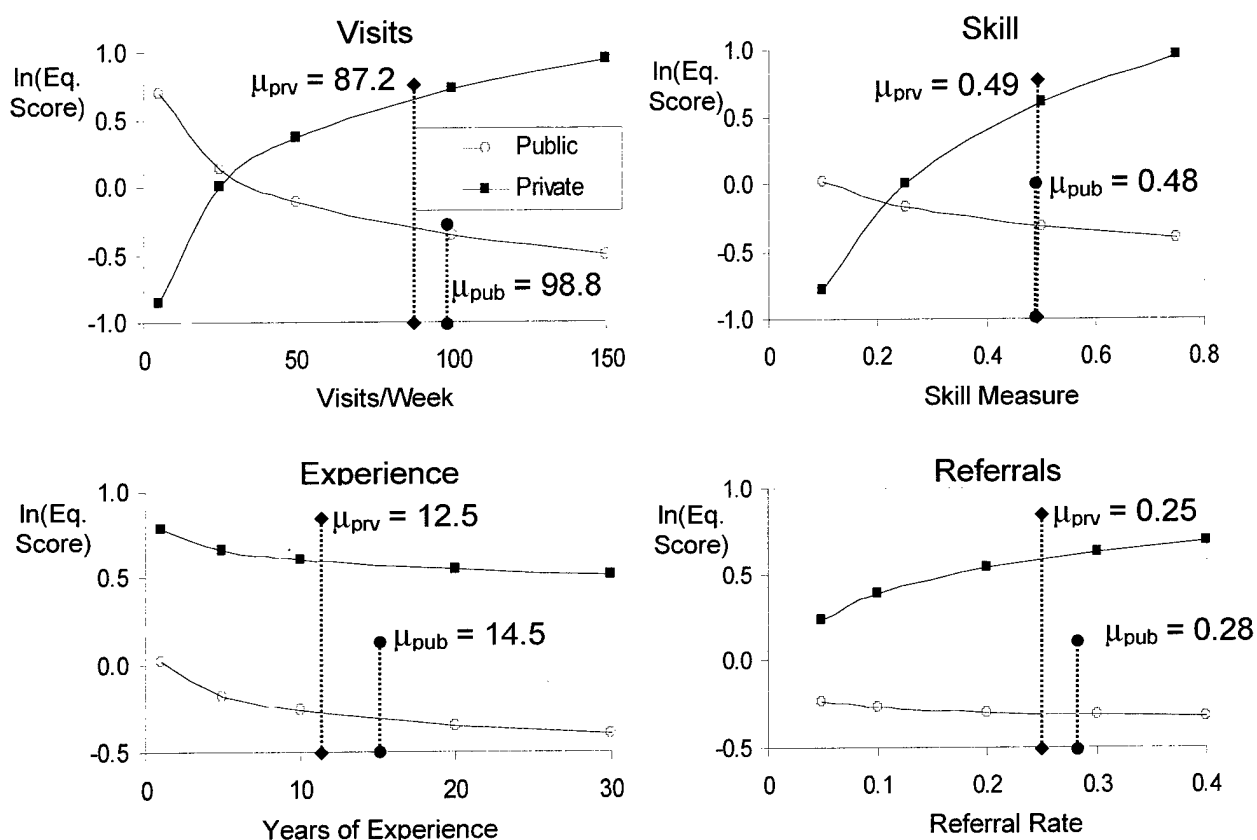
**Figure 7.1 Predicted Workloads**



These plots show that the productivity of average private physicians is greater than that of public physicians over relevant ranges of these predictor variables. Even here, the differences are subtle; public sector productivity approaches that of the private sector at the mean value of nurses per physicians in public clinics. When all other variables are held at their respective sectoral means, average private sector productivity is higher than that in the public sector over a range of values for each of physician skill, years of experience, and referral rate. Clearly, trends in each plot reflect the values of the coefficient estimates for each sector.

Similar predicted value simulations for basic equipment availability reinforce the differences between sectors. These plots are depicted in Figure 7.2.

**Figure 7.2 Predicted Basic Equipment Availability**



These results provide a better illustration of the effect, indicated in Table 7.6, of the comparability of basic equipment for physicians with low output. Poorly skilled private physicians, all else held constant at a mean value, also have available comparable or lower

level of basic equipment. That this behavior is seen for both low output and low skill measures strengthens the interpretation that less successful private physicians are less able to finance capital investments in their clinics. This also is consistent with the skill measure being associated with patient perceived quality of care and patient self-selection in favor of more highly skilled physicians.

## DISCUSSION

The aim of this analysis was to determine if there were benefits of private practice in terms of production of patient care. These results indicate that there is a subtle difference in physician productivity, measured by patient visits per week, between the public and private sectors. There are also important differences in factors affecting the workload and also in the ability of public and private physicians to use resources in treating patients. One of the most notable findings is that private physicians, with greater levels of equipment available, are able to provide more equipment-intensive care and that this effect is greatest for high volume departments. This reflects the ability of successful private physicians, with consequent higher revenues, to self-finance clinics with greater levels of capital equipment. Other important relationships are discussed in more detail below.

Results of the workload model show that physician productivity, controlling for other factors, is greater in the private sector on average. This is consistent with the expectation that private physicians would tend to increase workloads to increase income. That this difference in workloads is not observed in the unadjusted means workloads may be due to several causes. First, private physicians are highly regulated by the HIF and the limit on the number of patient visits per week is approximately equal to the mean that the physicians report. Second, while private physicians' income is dependent on the number of patient visits, it is also conditioned on the number and types of services provided. Finally, private physicians also have strong incentives to raise patient satisfaction in order to maintain or increase the size of their patient roster. Competing on quality in this way leads private physicians to provide a type of care that is interpreted by the patient as higher quality care. These last two sets of incentives – FFS payment and patient satisfaction – motivate private physicians to provide more equipment-intensive care, an effect supported for both basic and sophisticated equipment. With existing data, the influence of FFS payment and patient satisfaction

motives on equipment availability cannot be separately identified. Doing so would require a longitudinal experimental design.

Nursing labor is an important determinant of public sector physician workload and input utilization. Where coefficient estimates are significant, there is a consistent positive effect of low numbers of departmental nurses per physicians with indication of diminishing returns to nursing labor above two nurses per physicians. With 5 (of 18) public sector departments having more than three nurses/doctor, it may be possible to re-allocate nurses within public clinics. Considering the importance of nurses in public clinics, additional nursing resources may hold potential productivity gains in the private sector. However, one of the leading causes for the disparity in nurse staffing between the two sectors is that private physicians bear the full cost of nursing staff, whereas nurses salaries in public clinics are paid by the Health Center.

The effect of referrals on private physician production is much greater than for public physicians. In particular, referrals have a negative effect on physician productivity. This may arise if private physicians treat potential referrals more intensively to increase reimbursable services and/or to avoid referring less healthy patients. To the extent that private physicians' referral practices are distorted by Medical Center policies, liberalizing referral and hospital privileges would help boost productivity in the private sector and perhaps allow a more rational allocation of resources in the physician-patient encounter. This would also improve the continuity of care, a factor outside the scope of this analysis but an important element of the overall quality of care.

The skill measure adds a new dimension to the analysis of the production of care. Results of the first step of the model suggest that more highly skilled physicians in both sectors may be trading quantity for quality in treating patients. Considering capital equipment, more highly skilled physicians have available greater amounts of diagnostic equipment. To the extent that skilled physicians are better able to effectively use diagnostic equipment and treat patients in the less costly PHC setting, investments in Continuing Medical Education (CME) should result in important cost savings. Results of the input utilization estimations are also

consistent with more efficient application of consumable resources among higher skilled physicians. It would be interesting to validate these potential effects in a longitudinal design.

Estimates of the input utilization equations highlight effects of the overall status of the health sector and economy in general. One clear observation is that physicians in public clinics experience much lower levels of basic equipment than their private colleagues. The finding that public physicians' ability to use of basic equipment decreases as workload increases raises questions about the quality of public PHC care. Depletion of consumable resources is also a problem in both sectors. This too may pose a problem for the quality of care and reflects the depressed public budgets and state of the private economy. The simulations of predicted basic equipment availability for "average" physicians emphasizes that that problem of limited capital investment is not limited to the public sector, but also extends to low volume private clinics as well. It is interesting to note that private group practices do not exhibit higher levels of either basic or diagnostic equipment. That private group practice does not result in greater equipment availability suggests that group practices may be formed by physicians that can meet minimum equipment levels only jointly. Similarly, physicians that can self-finance above some level may be opting for solo practice.

## **8. Policy Implications and Recommendations**

This study has evaluated private sector health care provision in Macedonia from two complementary perspectives. First, I assessed how health sector policies establish markets for health care provision which promote fairness, competition, efficiency and quality of care delivery. Next, I analyzed how physicians respond to these policies and the financial incentives that they face in the two sectors. Together, these yield a comprehensive examination of private sector health care provision in transition economies.

In this final chapter, I broadly summarize the findings from a perspective of the types of incentives that the proposed reforms will establish. This brief discussion is followed by several specific recommendations to improve the success of the reform program.

### **IMPLICATIONS FOR REFORM POLICIES**

The analysis has shown evidence of productivity benefits among existing private PHC physicians. In addition, these physicians also respond to the incentives of private practice by having available higher levels of medical equipment, an effect also consistent with higher patient satisfaction. However, the overall findings of this study show that neither the existing policy environment nor that envisioned by the reform program allow market forces to significantly change physician practices in a post-socialist country. Indeed, physician responses to certain policies, such as arbitrary restrictions on productivity and referral prohibitions, suggest that the policies have a negative impact on efficiency and the quality of care. Moreover, the public sector delivery system is insulated from private sector competition by a web of policies and practices at all levels of the health sector. If left in place, this policy environment will dilute the ability of payment reforms to improve physician behavior.

This argument is best captured by the notion of the intensity of incentives. Incentive intensity describes the degree to which clinical decisions are influenced by physician payment

schemes; more intense incentives have greater effects on physician behavior (Latham, 1996; Pearson et al., 1997).<sup>1</sup> Considering the policies protecting public sector physicians from competition and effective performance-based feedback, the proposed reform program establishes two incentive regimes:

- in public health organizations, a weak form of capitation with less intense incentives; and,
- in the existing private sector, a strong form of capitation with more intense incentives.

In such a system, it is unlikely that either of these sectors will behave as a well-functioning market; efficiency, quality and continuity of care will suffer.

In contrast, this study has shown that the legacy of the preliminary privatization begun in 1991 has some positive aspects. It has improved patient choice. The MoH and HIF gained limited experience in regulating private PHC provision. Additionally, the consequent mobilization of private resources, while limited, has allowed most private physicians to provide more technologically intensive care than is possible in under-capitalized public clinics. To help build on the lessons of the early privatization, several recommendations for the reforms are discussed below.

## RECOMMENDATIONS

Results of this study have provided several technical insights into the functioning of the existing system of PHC provision in Macedonia (See also Chapter 4). These findings should be viewed as inputs to the process of developing effective, implementable reform policies – starting points for this ongoing effort. The following recommendations are organized in increasing scope: from physician payment incentives to policies of the overall health sector.

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<sup>1</sup> For example, bonus payments for meeting laboratory use guidelines that amount to 5% of total income are less intense, and physician test ordering patterns will change less, than a bonus amounting to 10% of total income. Incentive intensity also accounts for the time value of money in that the financial impact of clinical decisions under more intense incentives occur closer in time to that decision; annual bonus payments will have a lesser effect on clinical decisions than a monthly bonus plan with comparable payment levels.

## Payment Incentives

Currently, private physicians contracting with the HIF are reimbursed on a pure fee-for-service basis. Physicians in public practice are paid a salary by the HIF through Health Center administration. The reforms aim to unify payment for all PHC physicians under a capitation system.

The difficulties of designing physician payment schemes are well illustrated by the Macedonian experience. Results of the quantitative analysis are consistent with incentives for service overprovision and relative low referrals of FFS payment in the private sector. Salaried public sector physicians have much higher referral rates than private sector colleagues, raising concerns over cost of secondary care. They also provide fewer services per patient as workloads rise. Neither condition is optimal. The main focus of the reforms – capitation – may not be optimal either as it tends to create incentives for underprovision of services and relatively higher referral rates.<sup>2</sup> As the reforms proceed, several additional elements of physician reimbursement should receive attention.

Creating incentives for cost reduction by making physicians financially responsible for their practices is at the heart of capitation. This is a radical departure from the long-standing norms in public clinics, and instituting unambiguous financial responsibility for all inputs to patient care will be essential to the improvements of efficiency and quality envisioned by the reforms. This reinforces extensive discussions of this issue specific to Macedonia elsewhere (Carter, 1997). Briefly, financial responsibility would encompass nurses, office space, capital equipment, laboratory services, supplies and medications. Tracking input use in each of these categories at the level of individual physicians may be beyond the capacity of Health Center information system in the near future. In the short-run, department- or even clinic-level fundholding schemes may be a solution. Similarly, controlling the incentives under capitation for high referrals to secondary/in-patient care and laboratory services may stretch

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<sup>2</sup> Newhouse (1996) makes the case that an optimal system would include elements of both capitation and FFS, with the appropriate balance of the two being determined with experimental demonstration programs.

the capacity of Health Center information systems, especially if use of these resources is tracked at the individual physician-level (as they should be if individuals continue to be the contracting agents). However, individual utilization reviews of referrals may be adequate in the near term.

Another issue intimately related to the payment system is improving productivity. Measured as patient visits per week, physician utilization is uniformly low in Macedonia. Raising it could increase patient access and, potentially, quality of care for a greater part of the population. Physician workloads are arbitrarily limited in the existing private sector. Low motivation and lack of performance-based incentives hinder productivity in public clinics.

Introducing performance-based incentives and liberalizing health sector policies permitting competition (Chapter 4) will also boost productivity and quality. An additional step would be to remove, or raise, the limits on physician workloads in the reforms. Maintaining ceilings on the number of weekly patient contacts that physicians may have could adversely restrict patient access. Other methods may help control churn; for example, upper limits on the number of enrollees for individual physicians. Other procedural methods can be put in place to detect the few remaining instances of churn, including utilization reviews and referral limits.

### **Clinic Resources**

Existing private physicians bear financial responsibility for the operations of their clinics, and may retain any net revenues from the FFS reimbursement for allowed services. PHC physicians in the public sector, in contrast, are not reimbursed for specific services nor do they bear the financial costs of a clinic. The reforms seek to reorient these disparate incentives by allowing all physicians to retain the difference between the capitation payment and the costs of treating patients. However, under current reform proposals, financial responsibility for, and access to, clinic resources is not well defined for physicians in public

clinics. Furthermore, the existing system has created clear disparities in levels of capital and human resources in public and private clinics. Thus, in planning for the reforms, there are two key areas of concern over capital equipment and other clinic resources.

The first of these stems from the actions of the HIF to restrict the size and competitiveness of the private sector. Under the reforms with all PHC physicians under contract, the HIF may still have similar control and further, this behavior may shift to Health Center management as the group that controls resources required by physicians. An extension of the current situation in the private sector to the public sector could distort the incentives intended by the payment reforms. For example, if publicly-owned Health Centers remain the single dominant PHC clinics in each municipality, though they are undercapitalized, clinic management could potentially charge above market rates by restricting physician access to equipment and other resources. To ensure that the reforms create incentives for efficient and appropriate resource use, contracts should be written between physicians in public clinics and clinic management. Such contracts should specify payment by physicians for equipment utilization, laboratory use, and use of nursing staff and other non-physician personnel. These contracts define rights and responsibilities for physician access to the *inputs* of patient care, and should be seen in the same light as the contracts between physicians and the HIF for the *output* of patient care.

Access to clinic resources is not a public policy issue in solo or small-group private practices, nor should it become one. However, access to capital equipment is likely to be a concern in public health centers if existing management structures remain in place. Health Center management is still subject to political appointment and facility ownership is held vaguely by the Ministry of Health. With Health Center physicians on contract to the HIF to provide patient services, how will access to Health Center resources be depoliticized? Viability of such contracts would be improved if clinic ownership were defined explicitly. Options include contracting operation of public clinics, or their sale, to private groups. An added complication to ensuring fair and transparent access to clinic resources through contracts is

that these reforms are inextricably linked with reforms of the legal system. Until there are cost-effective means of enforcing contracts, management of public clinics may suffer.

Secondly, public clinics have much lower levels of capital equipment than private PHC clinics. This situation is due largely to an historic lack of funding, which unfortunately promises to be a chronic condition for years to come. Improvements in capital investment in public clinics are a necessity. Increased grant aid is a possible source of funding as are mandated set-asides from physician revenues earmarked for capital improvements. These longer term solutions aside, mobilizing private resources may be the only option to quickly boost capital investment in all primary health care enterprises. However, public enterprises ownership and management are barriers to this mobilization. Contracting, or selling, public clinics may provide adequate incentives for private investment in capital equipment. Considering the banking system in Macedonia, there is a question whether enough funding could be generated to bring capital equipment to adequate levels. The Czech privatization program instituted a novel approach to this problem by financing capital investment loans, at a subsidized rate, on the proceeds of the sales of medical facilities (Che\_ka, 1993). The Czech privatization program is also instructive in that buyers took on restrictive obligations for operating the former public clinics and hospitals including agreeing to provide certain types of care and serving all patients.

### **Referral Policies**

There are a number of restrictions on patient access to care in the current PHC system. Private physicians are denied hospital privileges and access to patient records. Also, public sector physicians are prohibited from referring to private physicians. The main concerns here are that this may degrade the continuity of care and limit efficiency gains possible if care in both sectors were more closely integrated.

To promote effective competition for services and improve the continuity of care, referral practices and hospital privileges should be liberalized. In place of blanket restrictions on

referrals and privileges, other methods can regulate referrals to secondary and in-patient care. These include withholds and other financial incentives for meeting referral goals, pre-admission screening, and mandatory second-opinions for hospitalizations. Additionally, to counter the referral incentives of either FFS or capitation, physician referral practices must be regulated for both over- and under-referrals. Implementing and administering such monitoring system will be difficult under existing management and information technology resources. Until management capacity grows significantly in the Macedonian health sector, administrative reviews of individual physicians contracting with the Health Insurance Fund may be the most appropriate.

### **Education Policies**

The Macedonian health system inherited a number of educational policies still in transition. The medical faculty, at the direction of the MoH, has placed limits on the number of medical school enrollees, helping to control the supply of physicians. This study further highlights two other areas for increased attention in the reform program.

First, the importance of improving physician skill was demonstrated by evidence that: more highly skilled physicians are more successful; make a trade-off between numbers of visits and quality of care; and that better physicians are more restrained in the use of medications. All point to the potential value of continuing medical education (CME) in promoting better care and cost-savings in primary care settings. Secondly, the findings of this study also reflect the nature of the current graduate medical education system. Medical graduates compete for the few positions in the public sector, partly due to the benefits of completely subsidized graduate specialty training. Once trained, many public sector specialists then depart for the more lucrative private sector. Under the reforms, distinctions between private and public practice will diminish and so too the incentives to leave publicly-owned and operated clinics. Nonetheless, revisiting the policy of fully subsidized post-graduate education may be warranted once the reform policies for both PHC and secondary-care specialists are finalized.

## **HIF and MoH Regulations**

Contracts for professional services between individual physicians and the HIF are the basis of existing private sector PHC provision. For many private physicians, these contracts have also been the source of difficulty in terms of reimbursement delays, retroactive changes in allowed services, and high cost of dispute resolutions.

Similar contracts for professional services will be central to the reforms. Unfortunately, current HIF procedures for issuing and managing physician contracts are fragile and unreliable. To ensure the effective functioning of the health system the HIF and MoH should consider three elements of administrative reforms. First, procedures for granting and administering contracts must be standardized, made transparent, and disseminated to physicians. Physician participation in the establishment and evolution of these procedures may increase acceptance of rule changes. Second, grievance procedures for HIF contract actions should also be implemented that are transparent and less costly than existing procedures. This could be along the lines of the now defunct grievance board within the HIF, separate from the costly and still-transitioning legal system. Finally, improving the overall level of structural quality in the PHC system will be a long process. Developing a comprehensive quality assurance programs throughout the health sector will be a part of this process. This dissertation examined only one small aspect of government's role in quality assurance; standards enforcement. Equitable enforcement of quality standards by both the MoH and HIF will help improve quality of care throughout the system by encouraging both private and public clinics to meet facility quality standards.

## **CLOSING**

The early privatization of primary care provision in Macedonia took place without the benefit of a strategic reform plan, with mixed results. The current plan for PHC reform inadequately accounts for the unique privatization issues in transition economy health sectors. This dissertation has argued for a more comprehensive approach to reforming

primary care and provides a starting point for designing further privatization. The existing proposals for payment system reforms are an excellent basis for re-orienting financial incentives and changing physician behavior. Equally important, other implicit and explicit health sector rules and regulations must be addressed to ensure the success of these reforms. Doing so will help achieve a health care market that reduces the financial burdens of the public sector and also one that is effective and fair for all participants.

**TABLE A1: Covariance Matrix of all Model Variables, Public Physicians (n=73)**

	ln(Patients)	TimeNew	TimeFollow	BasicEq	DiagEq	Antibiot	MedsAll	Supplies	ln(Dept_123)	ln(Dept_456)	ln(RN/Doc12)
ln(Patients)	1.000										
TimeNew	-0.151	1.000									
TimeFollow	-0.062	0.501	1.000								
BasicEq	-0.129	0.044	0.198	1.000							
DiagEq	-0.226	-0.043	0.030	-0.132	1.000						
Antibiot	0.066	-0.008	-0.042	0.408	0.083	1.000					
MedsAll	-0.005	-0.038	-0.046	0.323	0.118	0.827	1.000				
Supplies	-0.129	0.171	0.015	-0.044	0.343	0.206	0.526	1.000			
ln(Dept_123)	0.037	0.006	0.057	-0.092	0.115	-0.423	-0.628	-0.285	1.000		
ln(Dept_456)	0.009	-0.119	-0.021	-0.048	0.082	-0.457	-0.647	-0.479	0.866	1.000	
ln(RN/Doc_12)	0.139	-0.060	-0.064	0.511	-0.136	0.572	0.474	-0.006	-0.479	-0.326	1.000
ln(RN/Doc_3+)	-0.094	0.023	0.031	0.557	-0.020	0.599	0.508	0.057	-0.449	-0.330	0.909
ln(YearsExp)	-0.035	0.033	0.161	0.062	0.148	0.015	-0.016	0.037	0.057	0.087	0.101
PostGrad	-0.095	0.078	0.229	0.299	0.098	0.041	0.040	-0.013	0.107	0.147	0.046
ln(Skill)	-0.215	0.114	0.006	-0.189	0.309	-0.033	0.065	0.220	-0.116	-0.131	-0.108
GP	0.277	-0.023	-0.177	-0.503	-0.009	-0.107	0.268	0.405	-0.257	-0.275	-0.205
PED	0.056	-0.044	0.104	0.247	-0.127	0.058	-0.290	-0.338	0.226	0.151	0.131
Acute%	-0.043	0.014	-0.011	0.060	0.011	0.076	-0.169	-0.082	0.177	0.069	-0.121
Referral	-0.203	-0.027	-0.146	-0.081	-0.218	-0.030	0.124	0.017	-0.215	-0.176	0.016
Ohrid	-0.220	0.063	0.013	0.133	0.349	0.354	0.705	0.759	-0.551	-0.631	0.139
Prilep	0.266	-0.121	-0.142	-0.476	0.466	-0.140	-0.413	-0.269	0.312	0.351	-0.115
Veles	0.096	0.182	0.071	0.069	-0.609	-0.148	-0.200	-0.155	-0.174	-0.264	0.131

**TABLE A1 (cont'd): Matrix of all Model Variables, Public Physicians (n=73)**

	ln(RN/Doc3+)	ln(YearsExp)	PostGrad	ln(Skill)	GP	PED	Acute%	Referral	Ohrid	Prilep	Veles
ln(RN/Doc_3+)	1.000										
ln(YearsExp)	0.148	1.000									
PostGrad	0.139	0.546	1.000								
ln(Skill)	-0.091	-0.445	-0.286	1.000							
GP	-0.238	-0.130	-0.302	0.198	1.000						
PED	-0.020	-0.013	0.048	-0.127	-0.792	1.000					
Acute%	-0.196	-0.078	-0.063	-0.158	-0.473	0.562	1.000				
Referral	0.023	-0.308	-0.318	0.215	0.297	-0.278	-0.188	1.000			
Ohrid	0.233	0.000	0.087	0.168	0.313	-0.333	-0.180	0.083	1.000		
Prilep	-0.226	0.055	-0.188	0.108	-0.087	0.255	0.262	-0.198	-0.400	1.000	
Veles	0.057	-0.075	-0.163	-0.073	-0.029	0.077	-0.003	0.117	-0.291	-0.356	1.000

**TABLE A2: Covariance Matrix of all Model Variables, Private Physicians (n=37)**

	ln(Patients)	TimeNew	TimeFollow	BasicEq	DiagEq	Antibiot	MedsAll	Supplies	ln(Dept_123)	ln(RN/Doc_12)
ln(Patients)	1.000									
TimeNew	-0.292	1.000								
TimeFollow	-0.096	0.726	1.000							
BasicEq	-0.392	0.143	-0.020	1.000						
DiagEq	-0.041	0.275	0.060	0.139	1.000					
Antibiot	-0.128	-0.094	-0.043	-0.269	0.036	1.000				
MedsAll	-0.206	-0.007	0.087	-0.179	0.103	0.820	1.000			
Supplies	-0.107	0.029	-0.031	0.135	-0.188	-0.020	-0.068	1.000		
ln(Dept_123)	0.311	-0.087	-0.055	-0.140	-0.230	0.073	0.042	0.066	1.000	
ln(RN/Doc_12)	0.407	-0.046	0.068	-0.056	0.080	-0.041	-0.062	-0.125	0.218	1.000
ln(YearsExp)	-0.257	0.482	0.375	0.413	0.202	-0.424	-0.313	0.049	-0.227	0.043
PostGrad	-0.359	0.511	0.452	0.439	0.122	-0.265	-0.152	0.063	-0.246	-0.075
ln(Skill)	-0.240	-0.150	-0.211	0.302	0.089	-0.015	-0.057	0.291	0.003	-0.238
GP	0.146	-0.256	-0.359	-0.297	0.287	0.173	0.305	-0.092	0.136	-0.092
PED	-0.111	0.156	0.338	0.204	-0.326	-0.257	-0.329	0.011	-0.126	0.002
Acute%	-0.471	0.336	0.195	0.413	-0.019	-0.091	-0.036	-0.172	-0.149	-0.395
Referral	-0.216	-0.387	-0.436	-0.003	-0.148	0.046	0.188	-0.062	0.265	-0.107
Ohrid	-0.307	0.243	0.191	0.118	0.248	0.150	0.329	-0.081	-0.146	-0.191
Prilep	-0.055	-0.213	-0.055	-0.135	-0.380	0.098	-0.121	0.352	-0.095	0.097
Veles	0.267	0.035	0.010	-0.326	-0.093	-0.081	-0.080	-0.094	0.274	-0.138

**TABLE A2 (cont'd): Covariance Matrix of all Model Variables, Private Physicians (n=37)**

	ln(YearsExp)	PostGrad	ln(Skill)	GP	PED	Acute%	Referral	Ohrid	Prilep	Veles
ln(YearsExp)	1.000									
PostGrad	0.884	1.000								
ln(Skill)	0.035	-0.054	1.000							
GP	-0.534	-0.552	0.062	1.000						
PED	0.491	0.511	-0.109	-0.926	1.000					
Acute%	0.368	0.408	0.012	-0.403	0.476	1.000				
Referral	-0.380	-0.368	-0.097	0.334	-0.247	-0.138	1.000			
Ohrid	0.276	0.349	0.188	-0.081	0.124	0.210	-0.017	1.000		
Prilep	0.008	0.068	0.268	-0.329	0.369	0.045	-0.354	-0.241	1.000	
Veles	-0.219	-0.351	-0.220	0.368	-0.326	-0.217	0.219	-0.531	-0.345	1.000

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